

**RSX-11M/M-PLUS
and Micro/RSX
Crash Dump Analyzer
Reference Manual**

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Micro/RSX Version 3.0

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PREFACE

MANUAL OBJECTIVES

This manual describes the operation of the Crash Dump Analyzer (CDA). It does not attempt to describe the operation of the RSX-11M-PLUS Executive or the significance of the individual data structures. The RSX-11M/M-PLUS Executive Reference Manual and the RSX-11M and RSX-11M-PLUS Guide to Writing an I/O Driver describe these data structures.

INTENDED AUDIENCE

This manual is intended for system managers who are responsible for interpreting system failures and for system operators who run CDA to generate dumps. Understanding CDA output requires a working knowledge of assembly language programming and the Executive data structures.

STRUCTURE OF THIS MANUAL

Chapter 1 explains the function of the Crash Dump Analyzer. It describes the system resources necessary and the procedure for obtaining a crash dump. The chapter continues with an overview of loadable crash dump drivers, and explains how to run CDA. The chapter also describes indirect command files as they pertain to CDA.

Chapter 2 describes the two ways that you can use CDA: by issuing the CDA command line or the DCL ANALYZE/CRASH_DUMP command. The chapter begins by describing the CDA command line format, including command line specifications and switches. Two summary tables provide quick reference on switch operation. Finally, the chapter concludes with a description of the DCL ANALYZE/CRASH_DUMP command.

Chapter 3 consists of examples and descriptions of CDA output listings.

Chapter 4 contains helpful hints for interpreting CDA output listings.

Appendix A contains a short description of each CDA error message.

Appendix B lists system macros that supply symbolic offsets for system data structures for RSX-11M.

Appendix C lists system macros that supply symbolic offsets for system data structures for RSX-11M-PLUS.

Appendix D lists error code definitions for Micro/RSX operating systems.

PREFACE

ASSOCIATED MANUALS

Refer to the RSX-11M/RSX-11S Information Directory and Index for a brief description of each manual in the RSX-11M documentation set.

Refer to the RSX-11M-PLUS Information Directory and Index for a brief description of each manual in the RSX-11M-PLUS documentation set.

CONVENTIONS USED IN THIS MANUAL

- (RET)** This symbol indicates that you press the RETURN key.
- []** Square brackets show elements in a command line format that are optional. For example, [/switch] indicates that you can include a switch if you want to, but you do not have to.
- [,...]** Square brackets around a comma and an ellipsis mark indicate that you can use a series of optional elements separated by commas. For example, (argument[,...]) means that you can specify a series of optional arguments by enclosing the arguments in parentheses and separating them with commas.
- red ink** Red ink in the examples of this manual denotes user input.
- pink shading** Pink shading in this manual indicates features that are specific to RSX-11M operating systems only.
- gray shading** Gray shading indicates features that are specific to RSX-11M-PLUS operating systems only.

SUMMARY OF TECHNICAL CHANGES

TECHNICAL CHANGES

- The system Assign Table, which is one of the report listings that CDA generates, has been changed. The table now lists logical assignments in two categories: system logical assignments, and user logical assignments. The entry in the table for each assignment includes its size in blocks, its type, and its status.
- Some of the system data structures that are shown in Appendix B and Appendix C have changed as a result of new system features such as support for logical names and networking. Refer to the specific data structures in Appendix B (RSX-11M) or Appendix C (RSX-11M-PLUS) to see the changes.

NEW DEVICE SUPPORT

You can specify any of the following new devices as the crash dump device for your system:

For RSX-11M/M-PLUS Systems

Device Type	Mnemonic
RA60/RX50 disk packs	DU:
RC25 removable disk packs	DU:
TK25/TU80 magnetic tapes	MS:
TK50 magnetic tapes	MU:

For Micro/RSX or Pregenerated RSX-11M-PLUS Systems

Device Type	Mnemonic
RD52 disks	DU:
TK25 magnetic tapes	MS:
TK50 magnetic tapes	MU:

ADDITIONS TO THE CRASH DUMP ANALYZER REFERENCE MANUAL

The following documentation has been added to this manual:

- Chapter 1 now includes a description of loadable crash dump support for Micro/RSX and pregenerated RSX-11M-PLUS systems. You load a crash dump driver by specifying a crash dump device. If the system crashes when the driver is loaded, the driver dumps the contents of memory at the time of the crash

SUMMARY OF TECHNICAL CHANGES

onto the specified crash dump device. When you do not want a crash driver resident in memory, you can unload it to the system disk. Thus, loadable crash drivers allow you to choose when you want crash dump support.

- Chapter 2 now includes a description of the DCL ANALYZE/CRASH_DUMP command. If your terminal supports the DIGITAL Command Language (DCL) command line interpreter, you can use the ANALYZE/CRASH_DUMP command to run CDA. Command qualifiers let you choose which report listings you want CDA to generate. You can also use qualifiers to specify the format of the CDA report listings.
- A new appendix, Appendix D, lists error code definitions for Micro/RSX operating systems, including facility-independent definitions and Bugcheck standard format definitions.

CHAPTER 1

INTRODUCTION

This chapter introduces the Crash Dump Analyzer (CDA). It describes the function of CDA, details the system features that CDA requires, and explains how to obtain a crash dump. The procedures for generating a crash dump vary from system to system. This chapter explains how to obtain a crash dump on different types of systems. Then this chapter describes how to run CDA, and how to use CDA with indirect command files. Finally, the last section of the chapter lists the six basic analysis listings that the Crash Dump Analyzer generates.

1.1 CRASH DUMP ANALYZER FUNCTION

CDA is a specialized utility that helps you establish the cause of system crashes. It is installed in a system as a nonprivileged task that any user can run. CDA reads the contents of a memory dump created by the crash dump routine of the Executive. CDA then uses the data in the Executive symbol table file (RSX11M.STB) to format the binary input of the memory dump into readable analysis listings. Finally, CDA prints the analysis listings on a line printer. Examining the CDA listings can help you to determine the cause of a system crash.

CDA is a nonprivileged task that any user can run.

1.2 SYSTEM REQUIREMENTS

Micro/RSX operating systems with the Advanced Programmer's Kit and pregenerated RSX-11M-PLUS operating systems support loadable crash dump drivers. Refer to Section 1.4 for a description of loadable crash dump support.

On RSX-11M operating systems, and on non-pregenerated RSX-11M-PLUS operating systems, you can select support for crash dump analysis during system generation. Refer to the RSX-11M System Generation and Installation Guide or the RSX-11M-PLUS System Generation and Installation Guide for instructions on how to include CDA in your system. If you select support for crash dump analysis during system generation, you specify a crash notification device and a crash dump device. The system then builds a crash dump routine into the Executive. Thereafter, when the system crashes, the crash dump routine displays a message on the crash notification device and writes the contents of memory onto the specified crash dump device. The contents of memory are the input to CDA. If you decide to change the crash dump or crash notification devices, you must perform another system generation in order to specify the new devices.

INTRODUCTION

Since CDA overwrites the contents of the crash dump device, you should not specify the system device as the crash dump device. Also, the following fixed disks cannot serve as CDA crash dump devices:

RA80
RA81
RD51
RC25

However, you may use any of the following mass storage devices as the crash dump device for your system.

For RSX-11M/M-PLUS Operating Systems

Device	Mnemonic
RP04/RP05/RP06 disk packs	DB:
DEctape II (TU58)	DD:
RK05/J/F disk cartridge	DK:
RL01/RL02 disks	DL:
RK06/RK07 disk cartridges	DM:
RM02/RM03/RM05 disk packs	DR:
DEctape (TU56)	DT:
RC25 removable disk pack	DU:
RA60/RX50 disk packs	DU:
RX01 diskette (RSX-11M only)	DX:
RX02 diskette	DY:
TU45/TU16/TE16/TU77 magnetic tapes	MM:
TS11/TU80/TSV05/TK25 magnetic tapes	MS:
TS03/TU10/TE10 magnetic tapes	MT:
TK50 magnetic tapes	MU:

For Micro/RSX and Pregenerated RSX-11M-PLUS Operating Systems

Device	Mnemonic
RL01/RL02 disks	DL:
RD51/RD52/RX50 disks	DU:
TSV05/TK25 magnetic tape	MS:
TK50 magnetic tapes	MU:

1.3 OBTAINING A CRASH DUMP

To obtain a crash dump, control of the processor must be transferred to the Executive crash dump routine following a system crash. The transfer of processor control depends on how the crash occurred and whether you built the Executive Debugging Tool (XDT) into your system during system generation.

System crashes can result from any of the following causes:

1. The processor encounters a program condition that causes it to trap to location 40 or to XDT.
2. An infinite loop condition occurs.
3. The processor encounters an unintentional HALT instruction in kernel mode (000000).

INTRODUCTION

When a program condition causes a processor trap and XDT is included in your system, control transfers automatically to XDT. You can then type X at the console terminal, and XDT transfers control to the crash dump routine. For example:

```
XDT>X (RET)
```

Refer to the RSX-11M/M-PLUS and Micro/RSX Debugging Reference Manual for a description of XDT.

If your system does not include XDT, a processor trap causes control to be transferred directly to the crash dump routine of the Executive.

When a system crash is the result of a HALT instruction or an infinite loop condition, you must restart the processor manually at location 40.

Regardless of how control is transferred, once the processor enters the crash dump routine, the routine prints the following informational message on the crash notification device:

```
CRASH-CONT WITH SCRATCH MEDIA ON ddnn
```

After displaying the message, the crash dump routine halts the processor so you can put the crash dump device on line. When the device is on line, restart the processor by depressing the Continue switch on the processor console. The crash dump routine then dumps memory on the crash dump device and halts the processor when the dump finishes. The volume in the crash dump device now contains a binary representation of the contents of memory at the time of the crash. These contents are the input to CDA. You can then reboot the system and run CDA to analyze the dump.

If you attempt to crash to an illegal device, the crash dump routine displays the following message on the crash notification device:

```
CRASH -- ILLEGAL CRASH DEVICE
```

After displaying the message, the crash dump routine halts. The illegal crash device error occurs if you specify a fixed media device as the crash dump device. If you have a removable media device on the same controller, you can switch the physical unit number plugs on the devices to assign the removable media device to the crash device. Then press the Continue key on the operator's console and the crash dump routine will attempt the dump again.

1.4 LOADABLE CRASH DUMP DRIVERS

The pregenerated RSX-11M-PLUS operating system and the Privileged Development option of the Micro/RSX Advanced Programmer's Kit include loadable crash dump drivers. Loadable drivers reside on an external storage device when they are not in use. Using loadable drivers for crash dump support reduces the size of the Executive and frees memory space for other purposes.

1.4.1 Crash Devices

Loadable crash dump support is provided by four loadable crash dump drivers, each of which dumps the contents of memory to a specific type of device. The following list shows the crash dump drivers and their corresponding device types.

INTRODUCTION

Crash Dump Driver	Crash Dump Device
DLCRSH.TSK	RL02 cartridge disk
DUCRSH.TSK	RX50 diskette
MSCRSH.TSK	TSV05/TK25 magnetic tape
MUCRSH.TSK	TK50 magnetic tape(Micro/R SX) TK50 magnetic tape(RSX-11M-PLUS)

If the crash dump driver is loaded and the system crashes, the contents of memory are dumped to the designated crash device. You can then use the Crash Dump Analyzer to investigate the cause of the crash. If there is not a crash driver resident in the system when the system crashes, the Bugcheck facility displays the following message:

```
SYSTEM FAULT DETECTED AT PC=xxxxxx FACILITY=xxxxxx ERROR CODE=xxxxxx  
CRASH -- CRASH DRIVER NOT LOADED  
nnnnnn  
@?
```

1.4.2 Loading a Crash Dump Driver

A loadable crash driver resides on the system disk until you specify a crash device. To specify a crash device, use the following command:

```
SET SYSTEM /CRASH_DEVICE:ddn: (RET)
```

This command loads a specific crash driver into a main memory partition and updates the crash data base. Also, you may use this command to change the crash dump device or to change the unit number of the crash device while the system is running.

When the crash driver is successfully loaded, you receive the following message:

```
SET -- Crash device ddn: has been successfully loaded
```

If the device that you specified as the crash device is not in the current system, the following error message is displayed:

```
SET -- Device not in system
```

If a crash driver is already loaded and you specify a different device with the SET SYSTEM/CRASH_DEVICE command, the system unloads the resident crash driver, loads the new driver for the device that you specified, and updates the crash data base. If a crash driver is loaded and you specify the same device but a different unit number, the resident driver remains loaded and the system changes the device unit number in the crash data base.

If you specify the system disk as a crash device, you receive the following warning message:

```
SET -- WARNING, System disk chosen as crash device  
SET -- Crash device ddn: has been successfully loaded
```


INTRODUCTION

Note that if your system disk is a removable disk, it is a valid crash dump device. The system warns you that you have specified the system disk, but it loads the crash dump driver for the disk despite the warning message. You should avoid using the system disk as the crash dump device, because the memory dump will overwrite the contents of the disk, unless you remove the system disk and replace it with a scratch disk when the system crashes.

It is not possible to crash to a fixed media device such as the RD51 fixed disk. If you indicate the RD51 or any other fixed disk as a crash device, you receive the following message:

```
CRASH -- ILLEGAL CRASH DEVICE
CRASH -- CONT WITH SCRATCH MEDIA ON ddn
```

At this point, you cannot obtain a crash dump of memory.

NOTE

You cannot select a crash device and unit number once the crash has occurred.

However, you may choose a crash device unit that is not in the current system. To do this, specify the address of the control and status register (CSR) of the device that you want as the crash device. Use the /REGISTER switch to specify the address of the CSR of the desired device:

```
SET SYSTEM /CRASH_DEVICE:ddn:REGISTER:csraddr (RET)
```

To display the current crash dump device unit, use the following command:

```
$ SHOW SYSTEM /CRASH_DEVICE (RET)
```

In response to this command, the system displays the current device unit, as follows:

```
CRASHDEV=ddn:
```

1.4.3 Unloading a Crash Dump Driver

You use the following command to unload a crash dump driver when crash dump support is unnecessary:

```
$ SET SYSTEM /NOCRASH_DEVICE (RET)
```

In response to this command, the system displays the following message:

```
SET -- Crash device ddn: is being unloaded
SET -- WARNING, Crash dump support is inactive
```

The system then unloads the crash dump driver and updates the crash data base. When there is no crash dump driver resident in memory, the Bugcheck facility services system crashes (refer to Appendix D for a list of error code definitions used by Bugcheck). Unloading the crash dump driver frees the memory space in the crash driver partition until you decide to reactivate crash dump support. You can reactivate crash dump support at any time simply by specifying a new crash device unit.

INTRODUCTION

1.4.4 When the System Crashes

When a Micro/RSX or pregenerated RSX-11M-PLUS operating system crashes, the reaction of the system depends on the type of crash support that is loaded when the crash occurs. There are three types of crash support:

1. The Bugcheck facility, which is a standard part of the operating system, and is therefore resident in memory
2. Loadable crash dump drivers
3. XDT, which is also loadable

Thus, when a system crashes, any of the following conditions may exist:

- A crash dump driver is loaded but XDT is not
- Both a crash dump driver and XDT are loaded
- XDT is loaded but a crash dump driver is not

1.4.4.1 A System Crash with a Driver Loaded and XDT Unloaded - If a system crashes when a crash driver is loaded but XDT is not loaded, the crash dump routine notifies you of the crash with the following message:

```
CRASH -- CONT WITH SCRATCH MEDIA ON ddn
```

After displaying this message, the crash routine halts the hardware processor so that you can make sure there is a scratch media in the crash device. When you have the crash device ready, press the P key followed by a carriage return to proceed.

In response to your command to proceed, the crash dump routine dumps memory to the designated crash dump device. When the dump is completed, the processor is again halted. During the memory dump, the processor Run light is on; when the dump is completed, the processor Run light goes off.

At this point, the medium in the crash dump device contains a binary representation of the contents of memory at the time the system crash occurred. This memory dump is the input to CDA. Now you can use the ANALYZE/CRASH DUMP command, which is described in Section 2.2 of this manual, to control how CDA processes the crash dump. Then you can analyze the output listings that CDA generates to determine why your system crashed.

1.4.4.2 A System Crash with a Driver Loaded and XDT Loaded - If a system crashes when a crash driver and XDT are loaded, control is transferred to XDT. After you use XDT to debug the system, if you want to obtain a crash dump, press the X key followed by a carriage return. The following message is then displayed:

```
CRASH -- CONT WITH SCRATCH MEDIA ON ddn
```

Now you can follow the procedure in Section 1.4.4.1 to obtain the crash dump.

INTRODUCTION

1.4.4.3 A System Crash with only XDT Loaded - If a system crashes when XDT is loaded but a crash driver is not loaded, control is transferred to XDT. However, when you enter the X command, the following is displayed:

```
SYSTEM FAULT DETECTED AT PC=xxxxxx FACILITY=xxxxxx ERROR CODE=xxxxxx
CRASH -- CRASH DRIVER NOT LOADED
```

1.4.4.4 Inducing a System Crash - In some situations, you may want to purposely induce a system crash. Then, if you have a crash driver loaded, you can dump the contents of memory and examine them. For example, suppose that you want to stop the processor from executing in an infinite loop. You can induce a system crash by performing the following procedure:

1. Push the Halt button on the processor. On processors with console ODT, the following is displayed:

```
nnnnnnn
@
```

2. Release the Halt button.

3. At the terminal, type 40G. The following is displayed:

```
CRASH -- CONT WITH SCRATCH MEDIA ON ddn

nnnnnnn
@
```

If you have a crash driver loaded, you can obtain a crash dump now by pressing the P key followed by RETURN.

1.5 RUNNING CDA

There are several ways to run CDA, and you can run it as either an installed or an uninstalled task. Also, you can run CDA from either the DCL or MCR command line interpreter (CLI). This section describes the alternative ways of running CDA.

If CDA is an installed task on your system, you can enter the CDA command line at the CLI prompt. After CDA processes your command, the CLI prompt returns. In the following example, MCR is the CLI:

```
>CDA CRASH_DUMP.LST,COPY.CDA=[1,54]/STB,DR5: (RET)
>
```

If CDA is installed and you want to enter commands directly to CDA, you can invoke the command level of the CDA utility by typing CDA and a carriage return. When you are finished using CDA, you exit from CDA by pressing CTRL/Z, which returns control to the CLI. In the following example, DCL is the CLI:

```
$ CDA (RET)
CDA>command line (RET)
CDA>command line (RET)
CDA>^Z
$
```


INTRODUCTION

If CDA is an uninstalled task, the system has to find and install the CDA task image file before it can run CDA. Therefore, the command you use depends upon the location of the CDA task image file (CDA.TSK). If CDA.TSK is in the system UFD or the system library, type:

```
RUN $CDA (RET)
CDA>command line (RET)
CDA>
```

On RSX-11M operating systems, you can use the RUN \$CDA command only if CDA.TSK is present in the UFD that corresponds to the system UIC on device LB:. On RSX-11M-PLUS operating systems, CDA.TSK must be present in the UFD that corresponds to the library UIC.

If CDA.TSK is present in the UFD that corresponds to the current UIC on the default system device (the current UFD for the terminal from which the command is entered), you can run CDA by typing the following command:

```
RUN CDA (RET)
CDA>command line (RET)
```

Finally, you can run CDA by using the DCL ANALYZE/CRASH_DUMP command:

```
$ ANALYZE/CRASH_DUMP (RET)
```

If your CLI is MCR, but your terminal also supports DCL, you can run the ANALYZE/CRASH_DUMP command by typing DCL and a space before the command. For example:

```
>DCL ANALYZE/CRASH_DUMP (RET)
```

Chapter 2 shows you how to use CDA command lines and the ANALYZE/CRASH_DUMP command.

1.6 INDIRECT COMMAND FILES

As with other utilities, you can enter CDA command lines directly from the terminal or from an indirect command file. However, CDA indirect command files must not contain a reference to another command file.

1.7 BASIC CRASH DUMP ANALYZER OUTPUT LISTING

While the Crash Dump Analyzer provides many output listing options, fundamental system information appears on the first six pages of output listing (you can suppress this information by using the /-SYS switch, which is described in Chapter 2). The first six pages of output listings contain the following information:

- Page 1 -- Volatile registers
- Page 2 -- Kernel stack
- Page 3 -- System common
- Page 4 -- System common labeled dump
- Page 5 -- Pool statistics
- Page 6 -- Assign table

Sections 3.1.1 through 3.1.6 describe these pages in detail.

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The system information section also includes three more pages if the relevant information is in memory at the time of the crash. These pages display group-global event flags, error log packets, and, on RSX-11M-PLUS systems, the contents of low core memory. Section 3.1.7 describes the group-global event flag page, Section 3.1.8 describes the error log page, and Section 3.1.9 describes the RSX-11M-PLUS low core memory page that is part of the system common dump.

CHAPTER 2

COMMAND LINES

CDA commands control how the Crash Dump Analyzer processes a memory dump and how it formats the output listings that it generates. You can use CDA command lines to enter commands directly to the CDA utility or, if your terminal supports the DIGITAL Command Language (DCL), you can use the DCL ANALYZE/CRASH_DUMP command to run CDA. This chapter describes CDA command lines and the ANALYZE/CRASH_DUMP command by showing the format of the command lines, the command specifications and qualifiers, and examples of how the commands work.

2.1 CDA COMMAND LINES

This section shows the CDA command line format, lists and describes command line switches, and provides some examples of CDA command lines.

The CDA command line has the following format:

```
CDA>[listfile/sw],[binaryfile/sw]=[symbolfile/STB],crash-input[/sw]
```

The CDA command line specifies the input to CDA and the output from CDA. The specifications to the left of the equal sign in the command line are output specifications, and those on the right side of the equal sign are input specifications.

You must include at least one output specification and one input specification in the command line. For output from CDA, you can specify a list file only, a binary file only, or both a list file and a binary file. For input to CDA, you must specify the crash-input, but the symbol file specification is optional.

Output file specifications are position dependent. Position dependent means that when you include both output specifications, you must place them in the positions shown in the command line. If you omit the list file, you must place a comma before the binary file specification.

Input file specifications are position independent and can appear in either order.

The remainder of this section describes CDA command line specifications.

Output Specifications:

listfile

The output specification of the formatted CDA analysis listings. You can use either a device or a file as the list file specification. If you specify a file, CDA creates the file and writes the output listings to the file. By default, CDA then

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spools the file to the system line printer queue, unless you specify otherwise. If you specify a device for the list file, CDA displays or prints its output listings on that specific device. For example, if you specify your terminal (TTnn: or TI:) as the list file, CDA displays the output listings on your terminal. Chapter 3 describes the analysis listings that CDA generates.

binaryfile

The file specification for the optional binary file. This file is a copy of the binary data that the crash dump routine wrote on the crash dump device. It allows you to selectively create an historical record of crash dumps. If you create this file during an initial analysis, you can use it for input to CDA at a later time. Since the crash dump routine overwrites the information on the crash dump volume with each successive dump, this feature allows you to use a single volume for all crash dumps.

If the crash dump device on your system is a secondary storage or sequential device, you can reduce CDA analysis time by copying the crash input to a binary file on another device. Then you can use the binary file as input to CDA for analysis.

Input Specifications:

symbolfile/STB

The file specification of the symbol table file for the crashed system. The /STB switch is an integral part of this file specification, because CDA uses the data in the symbol table file to format the binary memory dump into readable formats. If you omit this file specification and switch, CDA uses the default symbol table file, which is the file named RSX11M.STB in the UFD that corresponds to the current UIC.

crash-input

The source of the binary input to CDA. This specification can be either a device name (the crash dump device) or a binary file that was created during a previous CDA analysis. However, if the crash-input specification is a binary file, you cannot also include a binary file output specification in the command line.

Switches:

/sw

An optional CDA switch. The list file, binary file, and crash-input file specifications can include optional switches that modify CDA action. Each specification in the command line has its own switches. Section 2.1.1 describes the CDA switches and lists which specification they apply to.

File specifications in the CDA command line can appear in complete Files-11 format, with device name, UFD, file name, file type, and version number. When you omit any of these elements, CDA uses the defaults shown in Table 2-1. However, not all of the elements in file specifications have defaults.

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Table 2-1
File Default Values

File	Device	UFD	Default Value	
			File Name	File Type
List file	SY:	Current	None	.LST
Binary file	SY:	Current	None	.CDA
Symbol file/STB	SY:	Current	RSX11M	.STB
Crash-input	SY:	Current	None	.CDA

See Section 2.1.2 for examples of CDA command lines, which include examples that show how CDA uses default file types.

2.1.1 CDA Command Line Switches

Two kinds of command line switches, analysis switches and function switches, allow you to control CDA operation.

Analysis switches determine which analysis routines CDA applies to the crash input. Thus, you can select the types of data that you want CDA to output. For example, analysis switches can list information about all of the devices in the system, or they can list information about active devices only.

Function switches provide a number of options for controlling CDA output. For example, function switches can terminate an analysis after CDA encounters a specified number of errors, or they can limit the number of pages of output listings.

Both types of switches are file specific. That is, each switch applies to a particular file and may not be used without that file or with any other file.

2.1.1.1 Analysis Switches - Table 2-2 summarizes the analysis switches and gives brief descriptions of their effects. Some of the switches in Table 2-2 have synonyms or alternate mnemonics. These are shown under each switch. Expanded descriptions of each switch follow the table.

Table 2-2
Summary of CDA Analysis Switches

Switch	Function	Applies to File
/ACT /ATL	Lists the contents of the Task Control Block (TCB) for each active task	Crash-input
/ADV	Lists information for all devices in the system	Crash-input

(Continued on next page)

COMMAND LINES

Table 2-2 (Cont.)
Summary of CDA Analysis Switches

Switch	Function	Applies to File
/ALL	Lists the output of all analysis routines	Crash-input
/CLI /CPB	Lists the contents of the CLI Parser Blocks in the system	Crash-input
/CLQ	Lists the contents of the clock queue	Crash-input
/CTL	Lists information for each device controller	Crash-input
/DEV /DCB /SCB /UCB	Lists information for all active devices in the system	Crash-input
/DUMP:a:b:[c] /DMP:a:b:[c]	Lists the contents of physical memory between address a and address b; (c is an optional virtual starting address)	Crash-input
/HDR	Lists the contents of the task headers for each task resident in memory	Crash-input
/KDS:a:b	Lists the contents of the kernel data space from virtual address a to virtual address b (RSX-11M-PLUS systems only)	Crash-input
/KIS:a:b	Lists the contents of kernel instruction space from virtual address a to virtual address b (RSX-11M-PLUS systems only)	Crash-input
/PCB /PAR	Lists the contents of each Partition Control Block	Crash-input
/POOL	Lists the contents of the system's pool	Crash-input
/SECPOL	Lists the contents of system secondary pool (RSX-11M-PLUS systems only)	Crash-input
/-SYS	Suppresses listing of the system information	Crash-input
/TASK:name:a:b /TAS:name:a:b /TSK:name:a:b	Lists the contents of task "name" between virtual address a and virtual address b; lists the contents of task data space (if task includes data space) on RSX-11M-PLUS	Crash-input

(Continued on next page)

COMMAND LINES

Table 2-2 (Cont.)
Summary of CDA Analysis Switches

Switch	Function	Applies to File
/TCB /TAL /STD	Lists the contents of the TCB for every task in the System Task Directory	Crash-input
/TDS:name:a:b	Lists the contents of task data space (RSX-11M-PLUS only)	Crash-input
/TIS:name:a:b	Lists the contents of task instruction space (RSX-11M-PLUS systems only)	Crash-input

/ACT or /ATL (Task Control Blocks for Active Tasks)

File: Crash-input

Effect: CDA lists the contents of the Task Control Block (TCB) for each active task.

/ADV (All Devices)

File: Crash-input

Effect: CDA lists the contents of the control blocks for all devices in the system. To list active devices, use the /DEV switch.

/ALL (All Analysis Routines)

File: Crash-input

Effect: CDA applies all of its analysis routines (except those associated with memory and task dumps) to the specified crash-input. The output from these routines is listed in the following order:

1. System information
2. Active tasks information
3. Task headers information
4. Partition information
5. Common Block Directory entries
6. Device information
7. Clock queue contents
8. Device controller information
9. Pool contents

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/CLI or /CPB (Command Line Interpreter Parser Blocks)

File: Crash-input

Effect: CDA lists the contents of all Command Line Interpreter Parser Blocks (CPBs) in the system.

/CLQ (Clock Queue)

File: Crash-input

Effect: CDA lists the contents of the clock queue.

/CTL (Device Controllers)

File: Crash-input

Effect: CDA lists the contents of the controller table and Controller Request Block (KRB) for each device controller in the system.

/DEV, /DCB, /SCB, or /UCB (Devices in System)

File: Crash-input

Effect: CDA scans the system device tables and lists the contents of the control blocks for each active device in the system. To list all devices, use the /ADV switch.

/DUMP:a:b:[c] or /DMP (Physical Memory)

File: Crash-input

Effect: If only a and b are specified, CDA dumps the contents of physical addresses a through b inclusive and labels them with their physical addresses. If a, b, and c are specified, CDA dumps the contents of physical addresses a through b, but labels them with dummy virtual addresses, starting at the address specified by c.

CDA allows you to specify a virtual starting address because RSX-11M and RSX-11M-PLUS systems use physical memory in terms of virtual addresses. If you dump physical memory labeled with the corresponding virtual addresses, you do not have to translate physical addresses to virtual addresses as you read the dump.

/HDR (Headers for Memory-Resident Tasks)

File: Crash-input

Effect: CDA lists the contents of the task headers for each task resident in memory.

/KDS:a:b (Kernel Data Space)

File: Crash-input

Effect: CDA lists the contents of kernel data space between the virtual addresses a and b inclusive.

/KIS:a:b (Kernel Instruction Space)

File: Crash-input

Effect: CDA lists the contents of kernel instruction space between the virtual addresses a and b inclusive.

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/PCB or /PAR (Partition Control Blocks)

File: Crash-input

Effect: CDA outputs a map that lists all the occupants of memory and the contents of each Partition Control Block (PCB).

/POOL:a:b (System Pool)

File: Crash-input

Effect: CDA lists the system pool in octal, Radix-50, and ASCII.

/SECPool[:a:b] (Secondary Pool)

File: Crash-input

Effect: Lists the contents of the secondary pool on RSX-11M-PLUS systems.

/STD, /TCB, or /TAL (System Task Directory)

File: Crash-input

Effect: CDA lists the contents of all of the Task Control Blocks in the System Task Directory (STD) at the time of the crash.

/-SYS (System Information)

File: Crash-input

Effect: CDA suppresses the system information listing.

/TASK:name:a:b, /TAS, or /TSK (Task Virtual Address Space)

File: Crash-input

Effect: CDA lists the virtual address space from the 16-bit virtual address a through b for the task specified by "name." If you do not specify addresses, CDA lists the task's entire virtual address space.

/TDS:name[:a:b] (Task Data Space)

File: Crash-input

Effect: CDA lists the contents of the task data space between the virtual addresses a and b inclusive. If you do not specify addresses, CDA lists the entire task data space.

/TIS:name:a:b (Task Instruction Space)

File: Crash-input

Effect: CDA lists the contents of the task instruction space between the virtual addresses a and b inclusive. If you do not specify addresses, CDA lists the entire task instruction space.

2.1.1.2 Function Switches - Table 2-3 summarizes the function switches and gives brief descriptions of their effects. Expanded descriptions of each switch follow the table.

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Table 2-3
Summary of CDA Function Switches

Switch	Function	Applies to File	Default ¹
/BL:n	Identifies the starting block number of the crash-input device; the value of n must be less than 65535.	Crash-input	n=1
/DENS:n :HIGH :LOW	Sets density of crash input tape to 800 or 1600 bits per inch (bpi)	Crash-input	n=800
/EXIT:n	Terminates analysis after encountering n analysis errors	List file	--
/LIMIT:n	Limits output listing to n pages	List file	n=300.
/LINES:n	Limits page length to n lines	List file	n=60.
/MEMSIZ:n	Saves nKb memory from crash in a binary file	Binary file	n=124.
/KMR	Forces the assignment of kernel address register values for the crashed system	Crash-input	/-KMR
/-SP	Does not print analysis output listing	List file	/SP
/STB	Identifies the file specification that contains the Executive symbol table	Symbol file	--

1. n can be expressed as an octal or decimal number. A decimal point (.) following the number denotes decimal.

/BL:n (Identify Starting Block Number)

File: Crash-input

Effect: CDA reads the dump from the input device beginning at block n. If the crash dump device is not a disk or a DECTape, CDA ignores this switch.

Default: n = 1

/DENS:n (Sets Tape Density)

:HIGH
:LOW

File: Crash-input

Effect: CDA reads the crash input tape at the density specified: 800 or 1600 bpi. You can also use LOW to indicate 800 bpi or HIGH to indicate 1600 bpi.

Default: n=800

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/EXIT:n (Exit After n Errors)

File: List file

Effect: CDA maintains an error count. As it encounters inconsistencies in the system data structures, it increments this count. If you specify the /EXIT:n switch, CDA terminates analysis after n errors. If you specify the /EXIT switch but do not specify n, CDA exits after one error.

Default: CDA runs to completion.

/LIMIT:n (Limit Output Listing)

File: List file

Effect: The /LIMIT:n switch limits the number of pages of analysis output. When CDA has generated n pages, it terminates the analysis and prints a message on the user terminal indicating that it has done so.

Default: n = 300.

/LINES:n (Print n Lines per Page)

File: List file

Effect: This switch lets you specify the number of lines you want CDA to print per page. After n lines are printed, a new page is ejected.

Default: n=60.

/MEMSIZ:n (Establish Size of Binary Output File)

File: Binary file

Effect: This switch causes CDA to create a binary output file 4*n blocks long and to transfer nKb words to it from the crash-input file. The value of n must be greater than 16.

This switch is particularly useful when transferring binary crash dumps from disk or DECTape. Since disks and DECTapes have no physical EOFs, it is necessary to specify the size of the actual memory dump.

When the crash input resides on magnetic tape, the binary output file is filled with zeroes if the EOF is read before nKb words are transferred.

Default: n = 124.

/KMR (Assign Kernel Mapping Register Values)

File: Crash-input

Effect: On mapped systems, when CDA reads incorrect Page Address Register (PAR) values from the crash stack, it aborts the analysis and prints an error message on the terminal. If this happens, you can use the /KMR switch to retry the analysis. When you specify /KMR, CDA uses standard mapping values to convert kernel virtual addresses to physical memory addresses.

Default: CDA uses existing Page Address Registers.

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/-SP (Do Not Spool)

File: List file

Effect: CDA does not spool the analysis output listing to the system line printer queue. Instead, it creates an output list file on the device indicated in the output file specification. If you do not specify a device in the output file specification when you use the **/-SP** qualifier, CDA creates the output list file on SY0:.

Default: **/SP**

/STB (File Specified Contains the Executive Symbol Table)

File: Symbol file (RSX11M.STB)

Effect: The **/STB** switch identifies a file containing the Executive symbol table. This file must correspond to the crashed system. CDA opens the symbol file and extracts the necessary symbol values. If it fails to find any required symbol values, CDA aborts the analysis and returns an error message.

Default: [current UIC]RSX11M.STB

2.1.2 CDA Command Line Examples

The following examples illustrate CDA command lines. Assume that the user in these examples is logged in under UIC [301,356], that the crash dump device is DR5:, and that CDA is running as an installed task. Also, note how CDA uses default file types.

Example 1

```
>CDA (RET)
CDA>DUMP,DUMP=RSX11M.STB/STB,DR5: (RET)
```

This command line creates:

- A list file, DUMP.LST, in UFD [301,356], which is printed automatically
- A binary file, DUMP.CDA, in UFD [301,356]

CDA reads the binary crash dump input from the crash dump device (DR5:), makes a binary copy of the crash dump input named DUMP.CDA, analyzes the crash dump input according to the information in the Executive symbol table file named RSX11M.STB in UFD [301,356], and writes a formatted output listing to a file named DUMP.LST. CDA then spools DUMP.LST to the system line printer queue.

Example 2

```
>CDA (RET)
CDA>,DUMP=[1,54]/STB,DR5: (RET)
```

This command line creates a binary file named DUMP.CDA in UFD [301,356].

CDA reads the binary crash dump input from DR5: and analyzes it according to the information in the Executive symbol table file, which is named RSX11M.STB in UFD [1,54].

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Example 3

```
>CDA LP:=[1,54]/STB,DUMP (RET)
>
```

This command line creates an output listing on device LP:.

CDA reads the binary input from a previously created binary file named DUMP.CDA, and analyzes it in accordance with the information contained in the Executive symbol table file named RSX11M.STB in UFD [1,54]. The CDA output listings are then printed on LP:.

This command line is also an example of a CDA command that is issued from the CLI prompt. Thus, the CLI prompt returns after the command is issued.

Example 4

```
>CDA TI:=DUMP (RET)
>
```

This command line creates an output listing that is displayed on the terminal from which the command was issued.

CDA reads the binary input from a previously created binary file named DUMP.CDA and analyzes it according to the information in the default symbol table file, (the file named RSX11M.STB in the UFD that currently corresponds to UIC [301,356]). The CDA output listings are then displayed on TI:.

2.2 THE DCL ANALYZE/CRASH_DUMP COMMAND

If your terminal supports the DIGITAL Command Language (DCL) command line interpreter, you can run the CDA utility by using the DCL ANALYZE/CRASH_DUMP command as an alternative to the CDA command line. This section describes the ANALYZE/CRASH_DUMP command line format and qualifiers. The section concludes with some examples of ANALYZE/CRASH_DUMP command lines.

The ANALYZE/CRASH_DUMP command line has the following format:

```
ANALYZE/CRASH_DUMP[/qualifiers] crash-input[/qualifiers]
```

You use the ANALYZE/CRASH_DUMP command to specify CDA input and output. The command qualifiers that you place immediately after the command name specify the CDA output files and, optionally, the symbol table file that CDA uses to process the crash dump input. The crash-input specification is mandatory because it directs CDA to the source of the binary crash dump input.

Output Specifications:

You must specify at least one of the following command qualifiers as an output specification in the command line:

- /LIST: Specifies the output list file
- /BINARY: Specifies a binary copy of the crash-input file
- /SYMBOLS: Specifies the symbol definition file

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You can specify /LIST: only, /BINARY: only, or /LIST: and /BINARY: together. You can optionally specify /SYMBOLS: with any combination of the /LIST: and /BINARY: qualifiers. However, if you do specify /SYMBOLS, you must include at least one of the other command qualifiers (because the symbol definition file is not an output file; it is used by CDA to generate an output file). Section 2.2.1.1 provides complete descriptions of the functions of each of the command qualifiers.

If you omit the crash-input specification from the command line, CDA prompts you for it, as shown in the following example:

```
$ ANALYZE/CRASH_DUMP/LIST:LP: (RET)
Crash input? DR5: (RET)
```

If you enter the command name only, CDA prompts you for input and output, as shown in the following example:

```
$ ANALYZE/CRASH_DUMP (RET)
Crash output? /LIST:SY:[301,356]CRASH.LST:/BINARY:COPY.CDA (RET)
Crash input? DUMP.CDA (RET)
```

Note that if you enter an output file in this way, you must include the /LIST: or /BINARY: qualifiers as part of the output file specification.

Input Specification:

crash-input

Specifies the location of the binary input to the ANALYZE/CRASH_DUMP command. The crash-input specification can be the name of the crash dump device, or it can be a binary file that was created during a previous crash dump analysis.

When you enter an ANALYZE/CRASH_DUMP command line, you can include command qualifiers, qualifiers for the crash-input parameter, or both. Section 2.2.1 describes qualifiers.

2.2.1 ANALYZE/CRASH_DUMP Command Qualifiers

You can control the way CDA processes the crash input and how it formats the output listings by using command qualifiers in the command line. You can select the information that you want in the CDA output listings by using qualifiers for the crash-input specification. Section 2.2.1.1 describes command qualifiers. Section 2.2.1.2 describes the qualifiers that you can use when you specify the crash input.

2.2.1.1 Command Qualifiers - You can use command qualifiers with the ANALYZE/CRASH_DUMP command to control how CDA processes the binary crash-input, and how it formats the output analysis listings. You place command qualifiers immediately after the command name in the command line. Table 2-4 summarizes the command qualifiers and gives brief descriptions of their effects. Expanded descriptions of each qualifier follow the table.

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Table 2-4
Summary of ANALYZE/CRASH_DUMP Command Qualifiers

Command Qualifier	Function	Applies to File
/LIST:listfile[/qualifiers]	Specifies the output list file or device	List file
listfile qualifiers:		
/ERROR_LIMIT	Specifies an error limit at which CDA analysis terminates	List file
/PAGE_COUNT:n	Specifies the number of output pages	List file
/PAGE_LENGTH:n	Specifies the number of output lines per page	List file
/[NO]PRINTER	Specifies whether the output should be printed on the system line printer	List file
/BINARY:binaryfile[/qual]	Specifies an optional copy of the binary input file	Crash-input
binaryfile qualifier:		
/MEMORY_SIZE:n	Copies nKb words of memory from a crashed system	Crash-input
/SYMBOLS:symbolfile	Specifies the symbol definition file	Crash-input

Command Qualifier Descriptions:

/LIST:listfile[/qualifiers]
 /ERROR_LIMIT[:n]
 /PAGE_COUNT:n
 /PAGE_LENGTH:n
 /[NO]PRINTER

File: List file

Effect: Specifies the optional formatted CDA output list file. This list file consists of the analysis report listings that are described in Chapter 3. You can also specify a device for the list file, in which case CDA displays or prints its output listings on the specified device. You can control the list file output by using the following file qualifiers.

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List File Qualifiers:

`/ERROR_LIMIT[:n]`

Effect: CDA maintains an error count. As it encounters inconsistencies in the system data structures, it increments the error count. CDA terminates the crash dump analysis when it finds the number of errors that you specify with this qualifier. If you use the `/ERROR_LIMIT` qualifier without specifying a number, the crash dump analysis terminates after one error.

Default: CDA runs the analysis until it is completed.

`/PAGE_COUNT:n`

Effect: This qualifier limits the number of pages of analysis output. When CDA has generated `n` pages, it terminates the analysis and prints a message on the terminal indicating that the analysis has terminated.

Default: Analysis terminates after 300 pages.

`/PAGE_LENGTH:n`

Effect: This qualifier lets you specify the number of lines that you want CDA to print per output page. After the specified number of lines are printed, CDA breaks to a new page.

Default: CDA prints 60 lines per page.

`/[NO]PRINTER`

Effect: This qualifier prevents the printing of the analysis output on the system line printer. Instead, CDA creates the output list file on the device in the list file specification. If a device is not specified in the list file specification, CDA creates the output file on the default user disk (SY0:).

Default: CDA prints all output on the system line printer.

`/BINARY:binaryfile[/qualifier]` `/MEMORY_SIZE:n`

File: Crash-input

Effect: Specifies that an optional binary file should be created. This file is a copy of the binary data that the crash dump routine wrote on the crash dump device. If you create the file during an initial analysis, you can use it as input to the `ANALYZE/CRASH_DUMP` command at a later time. Also, because the crash dump routine overwrites the contents of the crash dump volume with each crash dump, this qualifier allows you to save the results of crash dumps. You can then reuse the same volume for successive crash dumps while maintaining a record of previous crash dumps.

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Binary File Qualifier:

/MEMORY_SIZE:n

Effect: Specifies memory size for the binary copy of the crash dump input file. You specify n, where n is the number of Kb words. CDA then creates a binary file 4n words long and transfers nKb words to it from the crash-input file. The value of n must be greater than 16(decimal).

Default: n=124

/SYMBOLS:symbolfile

File: Symbol definition file

Effect: Specifies the symbol definition file for the crashed system, which contains the Executive symbol table. The symbol file must correspond to the crashed system. CDA opens the file and extracts the necessary symbol values. If it fails to find any required symbol values, CDA aborts the analysis and returns an error message. If you omit this file specification, CDA uses the default file, which is the file named RSX11M.STB in the UFD that corresponds to the current UIC.

2.2.1.2 Crash-input File Qualifiers - You can select the analysis listings that you want CDA to output by using qualifiers for the crash-input file specification in the ANALYZE/CRASH DUMP command line. Table 2-5 summarizes the crash-input qualifiers and gives brief descriptions of their effects. Expanded descriptions of each qualifier follow the table.

Table 2-5
Summary of ANALYZE/CRASH_DUMP Crash-input Qualifiers

Qualifier or Argument	Function	Applies to File
/ACTIVE:(arg[,...])	Lists data on active tasks and/or devices	Crash-input
/ACTIVE arguments:		
DEVICES	Lists data about active devices	Crash-input
TASKS	Lists contents of the Task Control Blocks for active tasks	Crash-input
/ALL	Lists all available crash dump data	Crash-input
/BLOCK:n	Specifies the block number where crash dump begins on the crash dump device	Crash-input

(Continued on next page)

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Table 2-5 (Cont.)
Summary of ANALYZE/CRASH_DUMP Crash-input Qualifiers

Qualifier or Argument	Function	Applies to File
/CLOCK_QUEUE	Lists the contents of the clock queue	Crash-input
/CONTROLLERS	Lists device controller data	Crash-input
/DATA_STRUCTURES:(arg[,...])	Specifies which data structures are to be formatted and listed	Crash-input
/DATA_STRUCTURES arguments:		
COMMAND_PARSER	Lists contents of CLI Parser Blocks	Crash-input
DEVICE STATUS UNIT	List contents of the control blocks for active devices	Crash-input
PARTITION	Lists contents of Partition Control Blocks	Crash-input
TASK	Lists contents of the Task Control Blocks for tasks in the STD	Crash-input
/DENSITY:n	Specifies bits per inch for input device	Crash-input
/DEVICES	Lists contents of all Device Control Blocks	Crash-input
/DUMP[: (START:n,END:n,ADDRESS:n)]	Lists contents of physical addresses	Crash-input
/HEADERS	Lists contents of resident task headers	Crash-input
/KERNEL:(arg[,...])	Lists kernel contents	Crash-input
/KERNEL arguments:		
DATA: (START:n,END:n)	Lists contents of kernel data space	Crash-input
INSTRUCTION: (START:n,END:n)	Lists contents of kernel instruction space	Crash-input
REGISTERS	Forces assignment of values for the kernel address registers	Crash-input

(Continued on next page)

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Table 2-5 (Cont.)
Summary of ANALYZE/CRASH_DUMP Crash-input Qualifiers

Qualifier or Argument	Function	Applies to File
/PARTITION	Lists contents of Partition Control Blocks	Crash-input
/POOL: (START:n,END:n)	Lists pool contents	Crash-input
/SECONDARY_POOL[: (START:n,END:n)]	Lists contents of secondary pool from START to END	Crash-input
/[NO]SYSTEM	Suppresses listing of system information	Crash-input
/TASKS:(arg[,...])	Lists task data	Crash-input
/TASKS arguments:		
DIRECTORY	Lists contents of the Task Control Blocks for tasks in the STD	Crash-input
ADDRESS: (NAME:name[,START:n,END:n])	Lists contents of task addresses from START to END	Crash-input
DATA: (NAME:name[,START:n,END:n])	Lists contents of task data space	Crash-input
INSTRUCTION: (NAME:[,START:n,END:n])	Lists contents of task instruction space	Crash-input

File Qualifier Descriptions:

/ACTIVE:(arg[,...])
DEVICES
TASKS

File: Crash-input

Effect: Lists data on active tasks and devices.

/ACTIVE arguments:

DEVICES

Effect: Lists data on the devices active in the system at the time of the crash. If you want CDA to list data on all of the devices known to the system at the time of the crash, use the /DEVICES qualifier.

TASKS

Effect: Lists the contents of the Task Control Blocks of active tasks. If you want CDA to list the contents of the Task Control Blocks of all installed tasks, both active and dormant, use the /TASKS:(DIRECTORY) qualifier.

COMMAND LINES

/ALL

File: Crash-input

Effect: Analyzes all information available in the crash dump file (except the information associated with memory and task dumps). CDA lists the output in the following order:

1. System information
2. Active tasks information
3. Task headers information
4. Partition information
5. Common Block Directory entries
6. Device information
7. Clock queue contents
8. Device controller information
9. Pool contents

/BLOCK:n

File: Crash-input

Effect: Identifies the starting block number of the crash dump file on the crash input device. The value of n must be less than 65535(decimal).

/CLOCK_QUEUE

File: Crash-input

Effect: Lists the contents of the system clock queue.

/CONTROLLERS

File: Crash-input

Effect: Lists the contents of the controller table and Controller Request Block (KRB) for each device controller in the system.

/DATA_STRUCTURES:(arg[,...])

COMMANDPARSER
DEVICE
PARTITION
STATUS
TASK
UNIT

File: Crash-input

Effect: Selects which system data structures CDA will format and list.

COMMAND LINES

/DATA_STRUCTURES arguments:

COMMAND_PARSER

Effect: Lists the contents of the Command Line Interpreter (CLI) Parser Blocks.

PARTITION

Effect: Lists the contents of the Partition Control Blocks.

TASK

Effect: Lists the contents of the Task Control Block for every task in the System Task Directory (all installed tasks) at the time of the system crash.

DEVICE

Effect: Lists the contents of the Device Control Blocks for active devices.

STATUS

Effect: Lists the contents of the Status Control Blocks for active devices.

UNIT

Effect: Lists the contents of the Unit Control Blocks for active devices.

/DENSITY:n

File: Crash-input

Effect: Causes a crash input tape to be read at the density specified, 800 or 1600 bpi. The default is 800 bpi.

/DEVICES

File: Crash-input

Effect: Lists the contents of the control blocks for all devices in the system. To list only active devices, use the /ACTIVE:(DEVICES) qualifier.

/DUMP[: (START:a,END:b[,ADDRESS:c])]

File: Crash-input

Effect: Lists the contents of physical addresses a through b inclusive and labels them with their physical addresses. If you include address c, the /DUMP qualifier dumps the contents of physical addresses a through b, but labels them with dummy virtual addresses, starting at c.

/HEADERS

File: Crash-input

Effect: Lists the contents of the task headers for each task resident in memory.

COMMAND LINES

/KERNEL:(arg[,...])

DATA: (START:n,END:n)
INSTRUCTION: (START:n,END:n)
REGISTERS

File: Crash-input

Effect: Lists kernel data.

/KERNEL arguments:

DATA: (START:n,END:n)

Effect: Lists the contents of kernel data space from virtual addresses START:n to END:n.

INSTRUCTION: (START:n,END:n)

Effect: Lists the contents of kernel instruction space from virtual address START:n to END:n.

REGISTERS

Effect: Forces the assignment of the kernel address register values for the crashed system.

/PARTITION

File: Crash-input

Effect: Lists the contents of the Partition Control Blocks.

/POOL: (START:n,END:n)

File: Crash-input

Effect: Lists the contents of system pool between the addresses specified in octal, Radix-50, and ASCII.

/SECONDARY_POOL: (START:n,END:n)

File: Crash-input

Effect: Lists the contents of system secondary pool between the addresses specified by START and END.

/[NO]SYSTEM

File: Crash-input

Effect: The /NOSYSTEM qualifier suppresses the system information listing. The default action of CDA is /SYSTEM; that is, it lists the system information.

/TASKS: (arg[,...])

DIRECTORY
ADDRESS: (NAME:name,START:n,END:n)
DATA: (NAME:name[,START:n,END:n])
INSTRUCTION: (NAME:name[,START:n,END:n])

File: Crash-input/

Effect: Lists task data.

COMMAND LINES

/TASKS arguments:

DIRECTORY

Effect: Lists the contents of the Task Control Block for every task in the System Task Directory (all installed tasks) at the time of the system crash.

ADDRESS: (NAME:name, START:n, END:n)

Effect: Lists the contents of the task specified by NAME between the virtual addresses specified by START and END. Includes the contents of task data space if a task includes data space.

DATA: (NAME:name [, START:n, END:n])

Effect: RSX-11M-PLUS operating systems only. Lists the contents of task data space for the task specified by NAME.

INSTRUCTION: (NAME:name [, START:n, END:n])

Effect: RSX-11M-PLUS operating systems only. Lists the contents of task instruction space for the task specified by NAME.

2.2.2 ANALYZE/CRASH_DUMP Command Examples

The following examples illustrate the ANALYZE/CRASH_DUMP command. Assume that the user in these examples is logged in under UIC [301,356], and that the crash dump device is DR5:. In this way, you can note how CDA uses default file types. Also, assume that CDA is running as an installed task.

Example 1

\$ ANALYZE/CRASH_DUMP/LIST:CRASH/BINARY:COPY/MEMORYSIZE:250 DR5: (RET)

This command creates:

- An output list file named CRASH.LST in the current UFD for UIC [301,356].
- A binary copy of 250kb words of the crash dump from DR5: (the crash dump device). The copy is named COPY.CDA and is placed in the current UFD for UIC [301,56].

CDA reads the binary crash dump input from the crash dump device and analyzes it according to the default symbol definition file, since a symbol definition file is not specified in the command line. CDA uses the file named RSX11M.STB in the current UIC as the symbol definition file. CDA then generates a list file named CRASH.LST and spools it to the default system line printer queue. CDA also copies the specified amount of memory from the crash dump device to a binary file named COPY.CDA.

Example 2

\$ ANALYZE/CRASH_DUMP/LIST:LP5:/PAGE_COUNT:5 DR5:/BL:100 (RET)

This command creates a list file that is printed on LP5:.

CDA reads the crash input from DR5:, beginning at block 100, and analyzes it according to the default symbol definition file. CDA then prints the first five pages of its output listing on LP5:.

ANALYSIS LISTINGS

3.1.3 System Common

The listing in Figure 3-3 provides a selective interpretation of some of the items in system common. Each item in the following describes the corresponding numbered item in Figure 3-3. (Refer to the RSX-11M Guide to Writing an I/O Driver or the RSX-11M-PLUS Guide to Writing an I/O Driver for further information.)

Item	Description
1.	Time and date of crash, as set in the system
2.	The task that was running at the time of the crash (If no task was running, this field contains the null task. This condition could develop if all the active tasks are blocked at the time of the crash. For information on determining which task or driver was mapped at the time of the crash, see Section 4.1.1.)
3.	The address of the Task Control Block (TCB) of the current task
4.	The contents of the 4-byte system ID indicating system base level
5.	The first address available for partitions (the last address of the Executive plus 1)
6.	The system size in 32-word blocks and in total words
7.	System UIC
8.	Stack depth count
9.	Contents of the global event flag words
10.	Name of the system for which dump is generated
11.	Network UIC
12.	Device from which the system was booted
13.	Logical block number (LBN) of the beginning of the system image
14.	Size of system image file in blocks
15.	The octal value of the system feature masks and the meaning of each set bit
16.	Octal dump of system common in offset mode in numerical order by address

ANALYSIS LISTINGS

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CRASH OCCURRED AT 09:53:51 21-MAY-81 (1)

CURRENT TASK = LDR... TCB ADDRESS = 112050
 SSYSID = 30E SEXSIZ = 115000 SSYSIZ = 16384./512K SSYUIC = [2,54]
 SSTKDP = 000000 SCOMEF: <33-48> 000000 <49-64> 000000
 SYSTEM NAME = QUASAR SNTUIC = [102,54]
 LOAD DEVICE = DB0 LBN = 00124461 FILE SIZE = 496.
 SYSTEM FEATURE MASK (FIRST WORD) = 033377

BIT SET	MEANING
EXT	22-BIT EXTENDED MEMORY SUPPORT
MUP	MULTI-USER PROTECTION SUPPORT
EXV	20K EXEC SUPPORTED
DRV	LOADABLE DRIVER SUPPORT
PLA	PLAS SUPPORT
CAL	DYNAMIC CHECKPOINT SPACE ALLOCATION
PKT	PREALLOCATION OF I/O PACKETS
EXP	EXTEND TASK DIRECTIVE SUPPORTED
OFF	PARENT/OFFSPRING TASKING SUPPORTED
FDT	FULL DUPLEX TERMINAL DRIVER
DYM	DYNAMIC MEMORY ALLOCATION SUPPORTED
CEX	COMMUNICATIONS EXEC IS LOADED

SYSTEM FEATURE MASK (SECOND WORD) = 167400

BIT SET	MEANING
DPR	DIRECTIVE PARTITION SUPPORT
IRR	INSTALL, REQUEST, AND REMOVE TASK SUPPORT
GGF	GROUP GLOBAL EVENT FLAG SUPPORT
RAS	RECEIVE/SEND DATA PACKET SUPPORT
RBN	ROUND ROBIN SCHEDULING SUPPORTED
SWP	EXECUTIVE LEVEL DISK SWAPPING SUPPORTED
STP	EVENT FLAG MASK IS IN THE TCB

SYSTEM FEATURE MASK (THIRD WORD) = 025215

BIT SET	MEANING
CLI	MULTIPLE CLI SUPPORT
EIS	SYSTEM REQUIRES THE EXTENDED INSTRUCTION SET
CRA	SYSTEM SPONTANEOUSLY CRASHED (1=YES)
STM	SYSTEM HAS SET SYSTEM TIME DIRECTIVE
AST	SYSTEM HAS AST SUPPORT

Figure 3-3 System Common

ANALYSIS LISTINGS

\$CRLCK	One CPU dumps memory
\$CRSUN	Crash physical unit number
\$CTLST	Start of the Controller Table (CTB) list
\$CURPR	Current task priority
\$CXDBL	Context switching disabled flag
\$DEVHD	Pointer to first Device Control Block (DCB)
\$DICSV	Temporary storage for directive services
\$DRAPR	APR value to map directive partition
\$DVSAV	Saved CSR contents for error logging
\$ENTSQ	Error log entry sequence number
\$ERFLA	Error Logger flag word
\$ERHEA	Error Log message queue listhead
\$ERRPT	Pointer to Error Logger Task Control Block
\$ERRSQ	Universal error sequence number
\$EVBSQ	Buffer sequence number
\$EVDIS	Buffer position for next event
\$EVKS6	KISAR6 offset to buffer
\$EVLEN	Pointer to word beyond end of buffer
\$EVLOS	Number of events lost through saturation
\$EVSEQ	Event sequence number
\$EVTCTB	TCB address of event logger task
\$EXCRC	Executive read-only code cyclic redundancy check (CRC)
\$EXECL	Serialize access to executive data lock
\$EXSIZ	Executive size
\$FMASK	System feature mask
\$FORKL	Serialize access to fork list lock
\$FRKHD	Fork queue listhead
\$FXRPT	Pointer to parity error task
\$GEFDM	Group-global dummy mask address word
\$GEFPT	Group-global mask address pointer
\$GFTCB	Group-global user TCB pointer
\$GGEF	Group-global event flags listhead
\$GNLST	General use pool packet listhead

ANALYSIS LISTINGS

\$HEADR	Pointer to current task header
\$HFMSK	Hardware system feature mask
\$HRCPT	Pointer to HRC... task (privileged task for reconfiguration services)
\$ICAVL	ICB pool; same as core pool if no data space on system
\$IDLCT	Idle pattern count byte
\$IDLFL	Idle pattern flag in bytes
\$IDLPT	Idle pattern word
\$IICPU	Mask of interrupted URMs
\$IIFNL	Serialize access to \$MPTAB lock
\$IIMSK	Iist interrupt mask word
\$IINXT	Round robin word for \$IISVC
\$IIPND	Pending URM work word
\$INTCT	Clock interrupt ticks count
\$LBUIC	Library UIC
\$LDPCB	Current loader PCB pointer
\$LDRPT	Pointer to loader TCB
\$LOGHD	Logical device assignment listhead
\$LSTLK	Lock word; TCB address of owner
\$MCRPT	Pointer to MCR TCB
\$MOULS	Mount listhead
\$MXEXT	Last address in system common
\$NCPU	Number of processors in system
\$NTUIC	Network UIC
\$PARHD	Pointer to partition list
\$PASTH	Partition AST listhead
\$PFRSZ	Minimum size of largest fragment in pool
\$PFURM	URM to powerfail
\$PKAVL	Pointer to first preallocated I/O packet
\$PKMAX	Maximum number of preallocated I/O packets
\$PKNUM	Number of preallocated I/O packets currently in list
\$PLPAR	Pointer to secondary pool PCB
\$POLBP	Minimum priority for nonprivileged task to execute at low pool

ANALYSIS LISTINGS

\$POLFL	Executive pool usage control flags
\$POLHD	Listhead for secondary pool free list
\$POLST	Executive pool communications word
\$PRIFR	Current amount of free pool
\$PRIHL	Upper limit for pool monitoring
\$PRILL	Lower limit for pool monitoring
\$PRISZ	Minimum size of largest pool fragment
\$PRMOD	Processor model number
\$PRTAB	Processor current task priority table
\$PTCBL	Prototype TCB listhead
\$PTCPT	KISAR6 bias of prototype TCB
\$PTTCB	TCB address of pool recovery task
\$PWRFL	Power-fail recovery request flag
\$PWRLK	Serialize access to \$PWRMK lock
\$PWRMK	Mask of CPU in power-fail code
\$RNDC	Clock ticks for each scheduling interval
\$RNDCT	Number of clock ticks until next scheduled interval
\$RNDH	Highest priority class to consider
\$RNDL	Lowest priority class to consider
\$ROEND	End of read-only part of the Executive
\$RQSCH	Schedule request TCB address
\$RQTAB	Reschedule pointer to TCB table
\$SABPT	Pointer to System Account Block
\$SAHDB	Bias of current task header
\$SAHPT	Virtual address of current task header
\$SAVSP	Saved stack pointer
\$SCCTB	CTB if \$SCDEV contains KRB
\$SCDEV	UCB or KRB for status change
\$SCERR	Error return from driver
\$SCMOF	Offset to data space
\$SCOFL	On-line or off-line parameter
\$SECFR	Number of free blocks in secondary pool
\$SGFFR	Pointer into stack for \$SGFIN

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\$SHERR	Points to TCB of shadow error task
\$SHFCT	Minimum ticks between shuffler requests
\$SHFPT	Pointer to Shuffler Task Control Block
\$SHFTM	Time remaining before next possible request to Shuffler
\$SHLIM	Error packet limit
\$SHLOS	Number of packets lost from saturation
\$SHPCT	Current shadow error count
\$SHUMB	Root for UMB list
\$SIGFL	Task waiting for significant event
\$STALR	Sanity timer alarm enabled on CPU
\$STENB	Sanity timer enabled
\$STKDP	Stack depth indicator
\$SWPC	Clock ticks for each swapping interval
\$SWPCT	Number of clock ticks to next swapping interval
\$SWPR	Swapping priority
\$SWR	Multiprocessor console switch register
\$SYLHD	Listhead for System log input queue
\$SYSIZ	Size of memory in 32Kb-word blocks
\$SYUAB	Address of UAB for system tasks
\$SYUIC	System User Identification Code (UIC)
\$TKNPT	Pointer to Task Termination Notification Program (TKTN) Task Control Block
\$TKPS	Ticks per second
\$TNAME	Multiuser task name
\$TSKHD	Pointer to System Task Directory (STD)
\$TTNS	Tick of second
\$ULDPT	Microcode loader task TCB address
\$UMRST	Unibus Run Mask (URM) status table
\$VECTR	Highest vector address
\$XDTFI	Executive Debugging Tool (XDT) initialization table
\$XDTPR	Flag for prompts from XDT

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\$ABTIM 007572	\$ERRPT 000000	\$NETPF 000000	\$SWPCT 000036
\$ACTHD 112050	\$ERRSQ 000000	\$NTUIC 041054	\$SYSIZ 040000
\$AVRHD 000000	\$EXSIZ 115000	\$PARHD 114734	\$SYSNM 052521
\$CFLPT 046444	\$FMASK 033377	\$PARPT 017226	\$SYUIC 001054
\$CKCNT 177546	\$FRKHD 000000	\$PFRSZ 000310	\$TEMP0 110160
\$CKCSR 177546	\$GEFDM 000356	\$PKAVL 072230	\$TEMP1 064170
\$CKLDC 000000	\$GEFPT 010064	\$PKMAX 017	\$TEMP2 013356
\$CLICQ 000000	\$GFTCB 010064	\$PKNUM 012	\$TEMP4 000000
\$CLKHD 044414	\$GGEF 000000	\$POLBP 000063	\$TKNPT 107134
\$COPT 037356	\$HEADR 111700	\$POLFL 000200	\$TKPS 000074
\$CPTBL 010472	\$HFMSK 000003	\$POLLW 000144	\$TKTCB 112050
\$CRAVL 045074	\$IDLCT 000	\$POLST 000403	\$TSKHD 112050
\$CURPR 370	\$IDLFL 000	\$PRIHL 003100	\$TTNS 000066
\$CXDBL 000	\$IDLPT 103741	\$PRILL 001130	\$UMRHD 052642
\$DEVHD 063460	\$INTCT 177777	\$PRISZ 003370	\$UMRPT 170200
\$DICSV 001051	\$LBUIC 000454	\$PRMOD 000000	\$UMRWT 000000
\$DPM 000040	\$LDRPT 112050	\$PTTCB 053510	\$WTCSR 017226
\$ENTSQ 000001	\$LOGHD 052254	\$PWRFL 000000	\$WTDUM 017226
\$ERBAF 023	\$LSTLK 103640	\$RNDCT 000005	\$XCOM1 001600
\$ERFID 000000	\$MCRCB 104360	\$RQSCH 000000	\$XCOM2 001746
\$ERFLA 000	\$MCRPT 110160	\$SHFPT 106704	
\$ERHEA 000000	\$MOULS 046614	\$SIGFL 000000	
\$ERLOF 000	\$MXEXT 177777	\$STKDP 000000	

Figure 3-4 System Common Alphabetized Dump

ANALYSIS LISTINGS

3.1.5 Pool Statistics

The listing in Figure 3-5 contains information concerning the system pool. CDA derives Items 2, 3, and 4 by scanning the free block pointers of the pool. The minimum block size (that is, pool granularity) in Item 5 comes from the contents of \$CRAVL-2. Each item in the following list describes a correspondingly numbered item in Figure 3-5.

Item	Description
1.	Pool size in decimal bytes
2.	The largest fragment of pool space
3.	Total number of free bytes in pool
4.	Number of fragments not allocated
5.	Smallest possible block (This is the minimum number of bytes which may be requested at a time. The minimum block size is always four bytes.)
6.	Bit map in octal

Each bit in the bit map represents one 4-byte block. If the bit is set, the block is free. The first block in the pool is bit 0 of the first octal word in the bit map. The bits are numbered as follows:

Bit Number	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Binary	0	0	1	1	1	0	1	1	1	1	1	1	1	0	0	0
Octal	0		3			5		7			7					0

Any bits left over in the last word of the bit map are cleared.

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MINIMUM BLOCK SIZE (BYTES) = 4. (5)

[illegible]

Figure 3-5 Pool Statistics

ANALYSIS LISTINGS

3.1.6 Assign Table

Figure 3-6 is a listing of the logical device assignment table.

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ASSIGN TABLE

System Logicals:

SY = DR5:
Block: 1 Status: (Final)

EDTINI = SYS\$LOGIN:EDTINI
Block: 1

User Logicals:

Terminal: TT5:
SYS\$LOGIN = DR5:[COVERT]
Block: 2 Status: (Final, Privileged)

Terminal: TT24:
IN = DR5:
Block: 1 Status: (Final)

SYS\$LOGIN = DR5:[007,325]
Block: 2 Status: (Final, Privileged)

Terminal: TT75:
HOME = DR5:[7,40]
Block: 1

DEFCOR = DB3:[61,40]
Block: 1

DUMPS = LB:[4,54]
Block: 1

SYS\$LOGIN = DR5:[7,40]
Block: 2 Status: (Final, Privileged)

Figure 3-6 Logical Assignment Table

The Assign Table lists logical assignment table entries in two categories: system logicals and user logicals. The system logicals listing shows the logical name, the equivalence name, the number of blocks, and the status of an assignment. The user logicals listing also shows the terminal from which an assignment was made.

ANALYSIS LISTINGS

3.1.7 Group-Global Event Flags

Figure 3-7 shows a group-global event flag dump. If there are no group-global event flags, this dump does not appear.

Item	Description
1.	Group number
2.	Access count
3.	Group-global Event Flag Block dump (The last two words are the group-global event flags.)

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GROUP GLOBAL EVENT FLAGS

①
 GROUP NUMBER =1 ②
 ACCESS COUNT =177476
 GGEF DUMP: ③
 000000 056660 000401 177476 000015 000000

GROUP NUMBER =7 ACCESS COUNT =006332
 GGEF DUMP:
 000000 000000 000007 006332 000014 000000

Figure 3-7 Group-global Event Flags

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3.1.8 Error Log Packets

The listing shown in Figure 3-8 contains error logging information that resided in memory at the time of the crash. This page does not appear if no error log packets were in memory at the time of the crash. This data is not written to the Error Log file on disk.

- | Item | Description |
|------|-------------------------------------|
| 1. | Address of error log buffer |
| 2. | Error log packet entry type code |
| 3. | Error log packet entry type subcode |
| 4. | Time the packet was logged |
| 5. | Dump of error log packet in octal |

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ERROR LOG BUFFERS

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①	②	③
BUFFER ADDRESS = 072304	ENTRY TYPE CODE = 000002	ENTRY TYPE SUBCODE = 000001
TIME = 7-JUL-81 07:46:11		
④		⑤
000000 000000 000210 000034 000055 000401 030463 020040 003401		
000020 000025 000013 000402 003521 003407 005456 000106 000001		
000040 000046 046504 000001 000001 000000 047115 052105 031526		
000060 041117 000112 000000 000000 000000 000001 064766 000000		
000100 011532 000000 000000 000030 045662 131574 000424 047503		
000120 000400 001000 000003 000017 004010 177000 000000 000056		
000140 101220 172741 044702 000424 004301 100301 000000 000000		
000160 000253 177777 033065 022000 004066 000000 010341 100000		
000200 101721 000001 000001 105262 030111		

Figure 3-8 Error Log Packets

ANALYSIS LISTINGS

3.1.9 Low Core Memory Dump (RSX-11M-PLUS Only)

The listing shown in Figure 3-9 contains a dump of RSX-11M-PLUS low core memory, alphabetized by label.

The following summary lists labels found in RSX-11M-PLUS low core memory and their meanings:

\$CRSBF	Internal crash stack
\$CRUPC	Scratch user program counter (PC)
\$CRUST	Scratch user Processor Status Word (PSW)
\$CURPR	Pointer to current task priority
\$CXDBL	Context switch disable flag
\$DICSV	Temporary storage for directive service
\$DXDEP	Entry point to dynamic Executive debugger interface
\$DXDK5	Saved KINAR5 for dynamic Executive debugger interface
\$DXDRL	Relocation bias for dynamic Executive debugger interface
\$HEADR	Pointer to current task header
\$PARLV	Interrupt recursion level counter
\$RQSCH	Pointer to current reschedule pointer
\$SAHDB	Bias of current task header
\$SAHPT	Virtual address of current task header
\$SAVSP	Saved stack pointer
\$SIRWF	Supervisor instruction space read/write flag
\$STKDP	Stack depth indicator
\$SUPFL	Supervisor window flag
\$TKTCB	Pointer to current task TCB

RSX-11M-PLUS CRASH DUMP ANALYZER V3.0 19-APR-85 15:44 PAGE 3
LOWCORE ALPHABETIZED DUMP

\$CRSBF 000000	000000	000000	\$RQSCH 021712
000000	000000	000000	\$SAHDB 000000
000000	000000	000000	\$SAHPT 000000
000000	000000	000000	\$SAVSP 000000
\$CRUPC 000000	000000	\$DXDEP 000000	\$SIRWF 000
\$CRUST 000000	000000	\$DXDK5 000000	\$STKDP 000000
\$CURPR 021722	000000	\$DXDRL 000000	\$SUPFL 000
\$CXDBL 000	000000	\$HEADR 000000	\$TKTCB 000000
\$DICSV 000000	000000	\$PARLV 177777	

Figure 3-9 Low Core Memory

ANALYSIS LISTINGS

3.2 OPTIONAL INFORMATION

CDA gives you additional information when you use the analysis switches described in Chapter 2. Figures 3-10 through 3-24 illustrate the output that CDA provides when you use these switches.

3.2.1 Active Tasks

The listing shown in Figure 3-10 contains active task information. The Receive Queue, AST Queue, Receive-by-Reference Queue, and Offspring Control Block sections of this example appear only if the task has them; otherwise, they are suppressed. Section 3.2.2 describes the additional information in the active task listing when the active task is MCR.

Item	Description
1.	Task name
2.	Address of Task Control Block (TCB) for the task
3.	Name of the partition in which the task runs
4.	Address of Partition Control Block (PCB)
5.	Base address for the partition in which the task runs
6.	Device that contains task image
7.	Beginning logical block number (LBN) of the task on the device
8.	Running priority
9.	Number of outstanding QIO requests
10.	Current UIC (either the login UIC or the UIC specified with a SET command)
11.	Physical name of task's pseudo device
12.	Maximum size of task image in 32(decimal)-word blocks
13.	State of local event flags for task
14.	First status word (blocking bits), using the following three-letter codes: <ul style="list-style-type: none">-EXE - Task not executingRDN - I/O rundown in progressCIP - Task blocked for checkpoint in progressMSG - Abort message being outputCKR - Task has checkpoint request (RSX-11M-PLUS only)BLC - Increment blocking countSTP - Task stopped by CLI command

ANALYSIS LISTINGS

Item	Description
15.	Second status word (state bits), using the following three-letter codes: AST - Asynchronous system trap (AST) in progress SIO - Task stopped for buffered I/O DST - AST recognition disabled AFF - Task installed with affinity -CHK - Task not checkpointable SEF - Stopped for event flag REX - Exit AST specified HLT - Task being halted ABO - Task marked for abort STP - Task stopped SPN - Task suspended WFR - Task in wait-for state
16.	Third status word (attribute bits), using the following three-letter codes: ACP - Task is an Ancillary Control Processor (ACP) PMD - Task not dumped on synchronous abort CMD - Task is executing a CLI command REM - Remove task on exit PRV - Task is privileged MCR - Task requested as an external MCR function SLV - Task is a slave task CLI - Task is a command line interpreter RST - Task is restricted NSD - Task does not allow send data CAL - Task has checkpoint space in task image ROV - Task has resident overlays NET - Network protocol level GFL - Group-global event flags are locked SWS - Reserved for Software Services MPC - Mapping change with outstanding I/O

ANALYSIS LISTINGS

- | Item | Description |
|------|---|
| 17. | Fourth status word, using the following three-letter codes:

MUT - Task is a multiuser task

LDD - Task load device is dismounted

PRO - TCB is a prototype

PRV - Task was privileged but has cleared TB.PRIV with the GIN directive

DSP - Task was built for user data space

SNC - Task uses common synchronization |
| 18. | Octal dump of TCB in offset mode |

RECEIVE QUEUE (if the task has one)

- | | |
|-----|--|
| 19. | Starting address of receive block |
| 20. | Name of task |
| 21. | Octal dump of receive block in offset mode |

OFFSPRING CONTROL BLOCK (OCB) LIST (if the task has one)

- | | |
|-----|--|
| 22. | Exit event flag number of offspring task |
| 23. | Name of parent task |
| 24. | Octal dump of offspring control block in offset mode |

ASYNCHRONOUS SYSTEM TRAP (AST) QUEUE (if the task has one)

If a task has an AST Queue, CDA lists its contents. If the task also has a Receive Queue, the AST Queue appears immediately after the Receive Queue on the output listing. If the task does not have a Receive Queue, the AST Queue is listed after the fourth status word information (the example in Figure 3-10 does not include an AST Queue).

An item appearing in the AST queue may be one of the following:

- Unsolicited AST
- Floating point AST
- Receive data AST
- Receive-by-reference AST
- Parity error AST
- Requested exit AST
- Power fail
- CLI command arrival AST
- Buffered I/O AST

ANALYSIS LISTINGS

- Offspring task AST
- Segmented buffered I/O completion AST
- Task force trace bit trap AST
- Delayed I/O completion AST
- Group-global rundown AST
- I/O request packet
 - Address of AST block
 - A 2-byte indicator (The high-order byte is an offset into the header of the AST control block; the low-order byte is the length of the AST control block in bytes.)

NOTE

If the low-order byte is negative, the block is not an AST block, but an I/O request packet internal to the system. If the low-order byte is 0, the block is an unsolicited character AST.

- Number of bytes allocated on task stack
- Entry point of AST routine
- Number of AST parameters
- Octal dump of the AST block in offset mode (On RSX-11M-PLUS systems, two additional negative offset words appear in the dump.)

RECEIVE-BY-REFERENCE QUEUE (if the task has one)

If a task has a Receive-by-Reference Queue, CDA lists its contents. If the task also has an Offspring Control Block list, the Receive-by-Reference Queue appears immediately before the OCB list on the output listing. If the task does not have an OCB list, the Receive-by-Reference Queue is the last list on the Active Tasks listing (the example in Figure 3-10 does not include a Receive-by-Reference Queue).

- Address of Receive-by-Reference Queue Block
- Address of the Task Control Block (TCB) for the task that initiated the Send by Reference
- Contents of event flag mask
- Address of event flag mask
- Pointer to created attachment descriptor
- Offset into partition as specified in window definition
- Length to be mapped
- The receiving task's access rights to region being mapped
- Octal dump of Receive-by-Reference Block in offset mode

ANALYSIS LISTINGS

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ACTIVE TASKS

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...LDR (1)

TCB ADDRESS = 111650 (2) PAR = SYSPAR (3) PCB ADDRESS = 111434 (4)
 LOAD ADDRESS = 00461600 (5) LOAD DEVICE = LB0: (6) LBN = 00076636 (7)
 PRI = 248 (8) I/O COUNT = 0 (9) UIC = [1,24] (10) TI = C00: (11)
 MAX SIZE = 000035 (12) EVENT FLAGS = <1-16> 000001 (13) <17-32> 000000
 T.STAT: 000000 (14)
 T.ST2: 020020 -CHK STP (15)
 T.ST3: 050200 -PMD PRV NSD (16)
 T.ST4: 000000 (17)

TCB DUMP:

000000	000000	000370	000000	131574	045662	000000	111662	000000
000020	111666	000001	000000	022370	111300	000000	020020	050200
000040	000370	076636	031420	111434	000035	033500	111426	111426
000060	000000	000000	000000	000001	111672	000035	000000	000000
000100	000000	111750	000000	111754	000000	000000	000000	000000

⋮

RECEIVE QUEUE

RECEIVE BLOCK ADDRESS = 062000 (19) TASK NAME = TUSKRD (20)

000000	000000	100143	043624	062640	050210	016000	121502	024172
000020	140002	133406	000000	000000	000000	000000	000000	000000
000040	046522	000000						

⋮

OCB LIST:

EXIT EVENT FLAG (O.EFN) = 000000 (22)

PARENT TASK NAME = QMG... (23)

OCB DUMP:

000000	000000	000000	106424	121350	000000	000000	066117	131574
000020	000000	000000	000000	000000	000000	000000		

Figure 3-10 Active Tasks (Truncated)

ANALYSIS LISTINGS

3.2.2 Active Task (MCR)

The active task listing for the MCR task (MCR...) contains more information than the active task listing for other tasks. Figure 3-11 shows a listing in which the first 17 items are the same as those in Figure 3-10. The following list describes only the items that are different from those in the previous figure, when MCR... is the active task.

Item	Description
1.	Address of MCR input buffer
2.	Address of Unit Control Block (UCB) of the requesting terminal
3.	Device name and unit number of the terminal that sent block to MCR (ASCII characters)
4.	Octal dump of the MCR input buffer in offset mode
5.	Address of command buffer
6.	Address of Task Control Block of the requesting task
7.	ASCII dump of command buffer
8.	Octal dump of command buffer in offset mode

ANALYSIS LISTINGS

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ACTIVE TASKS

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MCR...

TCB ADDRESS = 114610 PAR = SYSPAR PCB ADDRESS = 037050
LOAD ADDRESS = 00174400 LOAD DEVICE = LB0 LBN = 00073747
PRI = 160. I/O COUNT = 0. UIC = [1,24] TI = TT3
MAX SIZE = 000100 EVENT FLAGS = <1-16> 000001 <17-32> 040000
T.STAT: 000000
T.ST2: 000020 STP
T.ST3: 051300 -PMD PRV CLI NSD CAL

TCB DUMP

000000	000000	000240	000000	050712	131574	000000	114622	000000
000020	114626	000001	040000	024552	113760	000000	000020	051300
000040	000240	073747	035636	037050	000100	112330	036046	036046
000060	000000	000000	000000	114674	000000	114700	000000	000000
000100	004256							

RECEIVE QUEUE

COMMAND LINE INPUT BUFFER ADDRESS = 036730 UCB = 030245
TT50 : ③

000000	043214	030245	035770	000050	000020	000000	030244	000400
000020	120430	001750	140030	000000	001751	140010	000027	000361
000040	000040	000000	000000	000000	000000	000000	000000	000214
000060	026226	000000	000000	117404	005627	000362	000000	000362
000100	000000	113234	000010	037050	000000	036120	036120	000000

MCR COMMAND BLOCKS

BUFFER ADDRESS = ⑤ 103100 TCB = ⑥ 102730

ASN DB01:=SY:/LOGIN ⑦

000000	000000	102730	051501	020116	041104	030460	036472	054523
000020	027472	047514	044507	015516	026226	000000	000000	117404
000040	024600	000420	000000	000420	000000	103020	000010	104074
000060	000000	060440	060440	060370	103370	000114	000612	033406
000100	170000	126102	000000	000000	000000	000000	000012	000137
000120	000000	000000						

Figure 3-11 Active Task (MCR)

ANALYSIS LISTINGS

3.2.3 Task Headers

Figure 3-12 is an example of a task header listing. The following list describes its contents.

Item	Description
1.	Task name
2.	Pointer to the first word in the task header
3.	Pointer to the first word in the Task Control Block (TCB)
4.	Contents of Processor Status Word (PSW) and Program Counter (PC)
5.	Contents of the general registers
6.	Initial contents of the PSW, the PC, and the stack pointer (SP)
7.	The task header size in decimal bytes, the number of windows required to map the task, and the number of logical unit numbers assigned to the task
8.	Current and default UIC
9.	Pointer to number of window blocks
10.	Pointer to header guard word
11.	Work area extension vector pointer
12.	Priority difference for swapping
13.	Directive Status Word
14.	Address of File Control Services (FCS) impure area
15.	Address of FORTRAN impure area
16.	Address of overlay impure storage

LOGICAL UNIT TABLE

- | | |
|-----|--------------------------------------|
| 17. | Logical unit number (LUN) |
| 18. | Physical device name before redirect |
| 19. | Window pointer in header |

ANALYSIS LISTINGS

Item	Description
20.	Low-order byte of this word indicates the number of map entries active; the high-order byte has the following bit assignments: WI.RDV=400 - read virtual address allowed if set WI.WRV=1000 - write virtual block allowed if set WI.EXT=2000 - extend allowed if set WI.LCK=4000 - set if locked against shared access WI.DLK=10000 - set if deaccess lock enabled WI.BPS=100000 - bypass access interlock if set
21.	Address of File Control Block
22.	File number
23.	File sequence number
24.	File Control Block status word
25.	Number of accesses
26.	Number of block locks

WINDOW BLOCKS

27.	The name of the partition in which the task runs
28.	The virtual limits of the task
29.	Address of attachment descriptor
30.	Window size in 32-word blocks
31.	Offset into partition
32.	Address of the first Page Description Register (PDR) used to map the window
33.	Number of PDRs used
34.	The contents of the last PDR used
35.	Octal dump of task header in offset mode

ANALYSIS LISTINGS

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TASK HEADERS

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TKTN (1)

(2) HEADER ADDRESS = 076060

(3) TCB ADDRESS = 107134

PS=170000 PC=122630 (4)

R0=120254 R1=000065 R2=000060 R3=140354 R4=120702 R5=051024 SP=120226 (5)

INITIAL PS = 170017 INITIAL PC = 120764 INITIAL SP = 120230 (6)

HEADER SIZE = 102. NO. OF WINDOWS = 1. NO. OF LUNS = 1. (7)

CURRENT UIC = [1,24] DEFAULT UIC = [1,24] (8)

H.WND = 076162 (9) H.GARD = 076224 (10) H.VEXT = 000000 (11) H.SPRI = 5. (12)

DSW = 000001 (13) H.FCS = 000000 (14) H.FORT = 000000 (15) H.OVLY = 000000 (16)

LOGICAL UNIT TABLE:

(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
#	DEV	WINDOW	W.CTL	W.FCB	F.FNUM	F.FSEQ	F.STAT	NAC	NLCK
1	TI0:	000000							

WINDOW BLOCKS:

(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)
PAR	VIRT LIMITS	ATT DESC	WND SIZE	OFFSET	1ST PDR	NO.	LAST PDR
TKNPAR	120000 127777	045220	000100	000000	177612	1	037406

HEADER:

000000	120226	000146	140354	163500	000424	000424	170017	120764
000020	120230	000000	000000	000000	000000	000000	000000	000000
000040	000000	000000	076162	000001	000000	000000	000000	000000
000060	000005	000000	000000	000000	000000	076224	000001	044570 (35)
000100	000000	000001	114450	120000	127777	045220	000100	000000
000120	000612	037406	170000	122630	051024	120702	140354	000060
000140	000065	120254	000000					

Figure 3-12 Task Headers (Truncated)

ANALYSIS LISTINGS

3.2.4 Command Line Interpreter Parser Block (CPB)

The listing shown in Figure 3-13 contains the Command Line Interpreter Parser Block for MCR. The listing corresponds to the following items:

Item	Description
1.	Task name of the CLI
2.	Starting address of the CPB
3.	C.PSTS, which is the CPB status word
4.	Dump of the CPB in octal

```
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CLI PARSER BLOCKS
```

```
CLI TASK NAME  MCR... ①
CPB ADDRESS = 010472  CLI NAME = MCR ②
C.PSTS:  SGL ③

CPB DUMP:

000000  110160 050712 000000 000040 003404 005015 000076 005015 ④
000020  041515 037122 000000
```

Figure 3-13 CLI Parser Blocks

3.2.5 Partition Information

CDA outputs partition information in two segments. The listing shown in Figure 3-14 contains system partition information, and the listing shown in Figure 3-15 represents individual partition information. The following list describes elements of Figure 3-14. Individual partitions include Attachment Descriptors and Wait Queues when they apply.

Item	Description
1.	Partition names
2.	Partition Control Block (PCB) address
3.	Base address of partition in memory
4.	Size of the partition
5.	Type of partition
6.	Task or tasks occupying the partition

ANALYSIS LISTINGS

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PARTITION INFORMATION

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M E M O R Y M A P

① PARTITION -----	② PCB ADR -----	③ BASE ----	④ SIZE ----	⑤ TYPE ----	⑥ OCCUPIED BY -----
<EXEC>		00000000	00044700		
<POOL>		00044700	00050100		
CEXPAR	114734	00115000	00003000	MAIN COMMON	
TTPAR	114670	00120000	00040000	MAIN DRIVER	TT:
EXCOM1	114624	00160000	00014600	MAIN COMMON	
EXCOM2	114560	00174600	00006100	MAIN COMMON	
SYSPAR	114514	00202700	00010000	MAIN TASK	MCR...
TKNPAR	114450	00212700	00010000	MAIN TASK	TKTN
DRVPAR	114404	00222700	00030200	MAIN SYS	
	114340	00222700	00002100	SUB DRIVER	DB:
	114240	00225000	00001200	SUB DRIVER	DK:
	114140	00226200	00003000	SUB DRIVER	DM:
	114040	00231200	00003000	SUB DRIVER	DR:
	113740	00234200	00001000	SUB DRIVER	EM:
		00235200	00000100	<HOLE>	
	113640	00235300	00001100	SUB DRIVER	DT:
	113540	00236400	00001400	SUB DRIVER	DX:
	113440	00240000	00002200	SUB DRIVER	DL:
	113340	00242200	00002600	SUB DRIVER	DD:
	113240	00245000	00001300	SUB DRIVER	LP:
	113104	00246300	00004300	SUB DRIVER	MM:
	112450	00252600	00000300	SUB DRIVER	CO:
LDRPAR	112404	00253100	00002500	MAIN TASK	LDR...
BASIC2	112340	00255600	00040000	MAIN COMMON	
FCSRES	112274	00315600	00040000	MAIN COMMON	
TSTPAR	112230	00355600	00100000	MAIN TASK	
GEN	112164	00455600	03322200	MAIN SYS	
	045620	00455600	00024000	SUB TASK	DB2FCP
	057144	00501600	00025500	SUB TASK	NETACP
		00527300	00005200	<HOLE>	
	064060	00534500	00023300	SUB TASK	RMHACP
	053004	00560000	00005200	SUB TASK	CA.T6
	073534	00565200	00005200	SUB TASK	CA.T30
		00572400	00005700	<HOLE>	
	045010	00600300	00005700	SUB TASK	PMT...

Figure 3-14 Partition Information

ANALYSIS LISTINGS

Each item in the following list describes a correspondingly numbered item in Figure 3-15.

Item	Description
PARTITION CONTROL BLOCK	
1.	Partition name
2.	Pointer to the first word of the PCB
3.	Type of partition
4.	Name of main partition
5.	Physical base address of partition in 32-word blocks
6.	Partition size in 32-word blocks
7.	Pointer to the first word of the TCB of attached task
8.	Partition protection word (mapped system only)
9.	Priority of attached task or partition
10.	I/O count of attached task or partition
11.	Partition status flags, using the following three-letter codes: <ul style="list-style-type: none">OUT - Partition is out of memoryCKP - Partition checkpoint in progressCKR - Partition checkpoint is requestedCAF - Checkpoint space allocation failure-CHK - Partition is not checkpointableFXD - Partition is fixedLFR - Last head of region failurePER - Parity error in partitionLIO - Marked by Shuffler for long I/ONSF - Partition cannot be shuffledCOM - Library or common blockDEL - Partition should be deleted when not attached
12.	Octal dump of PCB in offset mode

ANALYSIS LISTINGS

Item	Description
ATTACHMENT DESCRIPTOR	
13.	Address of attachment descriptor
14.	Partition to which attachment occurs
15.	Name of attaching task
16.	PCB attachment queue thread word
17.	TCB attachment queue thread word
18.	Priority of highest priority task attached to this partition
19.	I/O count of attached task on RSX-11M systems; I/O count of attached partition on RSX-11M-PLUS systems
20.	Number of times task is mapped through this attachment descriptor
21.	Attachment descriptor status byte, using the following three-letter codes: <ul style="list-style-type: none"> DEL - Task has delete access EXT - Task has extend access WRT - Task has write access RED - Task has read access PRO - TCB is secondary pool TCB bias SPB - Cache bypass request RBP - Request to not bypass cache
22.	Octal dump of attachment descriptors in offset mode

PARTITION WAIT QUEUE

23.	Name of the task awaiting access to the partition
24.	Address of TCB for the task
25.	TI: device for the task
26.	Task's priority
27.	Second status word (state bits)--same as item 15 of the active task dump (Section 3.2.1)

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28.	Resident mapped task count
29.	Wait queue contains partition description rather than task description

ANALYSIS LISTINGS

PARTITION	PCB ADR	TYPE	MAIN	BASE	SIZE	P.TCB	PRO	PRI	IOC
-----	-----	---	----	----	----	-----	---	---	---
DRVPAR	117270	SUB	DRVPAR	001312	000060	040754	000000	0.	0.

P,STAT: SYS DRV

000000	000000	000000	015746	062072	000000	117734	001312	000060
000020	000000	000000	000000	040754	000060	000000	000000	000000
000040	117326							

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
PARTITION	PCB ADR	TYPE	MAIN	BASE	SIZE	P.TCB	PRO	PRI	IOC
-----	-----	---	----	----	----	-----	---	---	---
SYSPAR	117074	MAIN	SYSPAR	001372	000105	115264	000000	0.	0.

P,STAT: ⑪

000000	117030	000000	075273	062072	000000	117074	001372	000105
000020	115764	115764	100200	115264	000000	042760	000000	042000
000040	041764							

} ⑫

WAIT QUEUE:

⑬	⑭	⑮	⑯	⑰
TASK	TCB ADR	TI	T.PRI	STATE BITS (T,ST2)
-----	-----	---	----	-----
F11ACP	115764	COO	149.	CAF STP

ATTACHMENT DESCRIPTORS:

⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳
ADDRESS	PARTITION	ATT TASK	A,PCBL	A,TCBL	PRI	IOC	MAP COUNT
-----	-----	-----	-----	-----	---	---	-----
042000	SYSPAR	...MCR	041764	000000	160.	0.	0.

A,STAT: WRT RED ⑳

000000	041764	000240	115264	000000	000003	117074	⑳
--------	--------	--------	--------	--------	--------	--------	---

Figure 3-15 Partition Control Blocks and Attachment Descriptors

ANALYSIS LISTINGS

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PARTITION INFORMATION

(28)

NAME	PCB ADR	TYPE	MAIN	BASE	SIZE	P.OWN	PRO	PRI	RMCT
GEN	117404	MAIN	GEN	004432	047346	000000	000000	0.	0.
P. STAT: 000000									
P. ST2: 000000									
000000	000000	000000	026226	000000	035724	117404	004432	047346	
000020	061774	063170	000000	000000	000000	000000	000000	000000	000000
000040	000000								

WAIT QUEUE: (29)

NAME	PCB ADR	TYPE	MAIN	BASE	SIZE	P.TCB	PRO	PRI	RMCT
BAP2	061774	SUB	GEN	012731	000372	061670	000000	50.	0.
P. STAT: 140010 OUT CKP DEL									
000000	063170	000062	026226	000000	063170	117404	012731	000372	
000020	000000	000372	074114	061670	140010	062474	000000	037360	
000040	037360								

Figure 3-15 (Cont.) Partition Control Blocks and Attachment Descriptors

3.2.6 Common Block Directory

CDA lists partition information, status words, and Partition Control Blocks for each installed, named common region. The listing in Figure 3-16 shows a Common Block Directory entry. The following list describes the items in Figure 3-16.

Item	Description
1.	Name of the installed common region partition
2.	Address of Partition Control Block (PCB)
3.	Type of partition
4.	Name of the main partition
5.	Physical base address of partition
6.	Size of partition in 32(decimal)-word blocks
7.	Owning UIC of the common region
8.	Partition protection word

ANALYSIS LISTINGS

- | Item | Description |
|------|---|
| 9. | Resident mapped task count |
| 10. | Partition status words (refer to Section 3.2.4) |
| 11. | Octal dump of PCB |
| 12. | Address of PCB of the common task image file |
| 13. | Address of Unit Control Block (UCB) of the device on which the common resides |
| 14. | Starting logical block number (LBN) of the common task image file |
| 15. | Word that always contains a 0 |

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COMMON BLOCK DIRECTORY

(1) NAME	(2) PCB ADR	(3) TYPE	(4) MAIN	(5) BASE	(6) SIZE	(7) P.OWN	(8) PRO	(9) PRI	(9) RMCT
BASIC2	043254	SUB	GEN	017747	000400	001454	000000	0.	0.
P.STAT:	000200	COM	} (10)						
P.ST2:	000006	APR							
000000	000000	000000	006273	034330	040370	117404	017747	000400	} (11)
000020	053550	000000	045240	001454	000200	000006	000000	000000	
000040	043312								

COMMON TASK IMAGE FILE PCB

(12) PCB ADR	(13) P.UCB	(14) P.LBN	(15) P.REL
045240	035662	000001,023653	000000

NAME	PCB ADR	TYPE	MAIN	BASE	SIZE	P.OWN	PRO	PRI	RMCT
FCSSUP	053550	SUB	GEN	000000	000212	000401	000000	0.	0.
P.STAT:	100200	OUT	COM						
P.ST2:	000000								
000000	000000	000400	023013	075030	000000	117404	000000	000212	
000020	047304	000212	040114	000401	100200	000000	000000	000000	
000040	053606								

COMMON TASK IMAGE FILE PCB

PCB ADR	P.UCB	P.LBN	P.REL
040114	035662	000002,001071	000000

Figure 3-16 Common Block Directory

ANALYSIS LISTINGS

3.2.7 Device Information

CDA lists information on all devices known to the system. The listing in Figure 3-17 shows a typical terminal device listing with an I/O packet. The Terminal Status Words (items 15, 16, and 17) appear only in listings for terminal devices. The codes for these items apply only to the full-duplex terminal driver. The section labeled I/O REQUEST PACKETS appears only for devices that have an I/O request in progress or an I/O request queued at the time of the system crash. The following list describes the items in Figure 3-17.

Item	Description
1.	Device name
2.	Address of offset 0 in Unit Control Block (UCB)
3.	Address of offset 0 in Device Control Block (DCB)
4.	Address of offset 0 in Status Control Block (SCB)
5.	Device to which unit is redirected
6.	Name of Ancillary Control Processor (ACP)
7.	Name of attached task
8.	Pointer to the UCB name of the owning terminal
9.	UIC used to log into the system
10.	Unit status byte, using the following three-letter codes: BSY - Unit is busy -MNT - Unit is not mounted FOR - Unit is mounted as a foreign volume MDM - Unit is marked for dismount PWF - Power fail occurred WCK - Write check enabled SPU - Unit is spinning up VV - Volume is valid
11.	Unit status extension byte, using the following three-letter codes: OFL - Unit off line -RED - Unit is not redirectable PUB - Unit is public device UMD - Unit attached for diagnostics PDF - Privileged diagnostic functions only

ANALYSIS LISTINGS

- | Item | Description |
|------|---|
| 12. | Control Processing flags, using the following three-letter codes: <ul style="list-style-type: none">-ALG - Byte alignment not allowedNPR - Device is a NPR deviceQUE - Call driver before queuingPWF - Always call driver at power fail entry pointATT - Call driver on attach/detachKIL - Always call driver at I/O kill |
| 13. | First device characteristics word, using the following three-letter codes: <ul style="list-style-type: none">REC - Record-oriented deviceCCL - Carriage-control deviceTTY - Terminal deviceDIR - File-structured deviceSDI - Single directory deviceSQD - Sequential deviceMSD - Mass storage deviceEXT - Unit on extended 22-bit UNIBUS controllerUMD - User-mode diagnostics supportedMBC - MASSBUS deviceSWL - Unit software write lockedISP - Input spooled deviceOSP - Output spooled devicePSE - Pseudo deviceCOM - Device is mountable as COM channelFll - Device is mountable as Files-11 deviceMNT - Device is mountable |
| 14. | Second device characteristics word, using the following three-letter codes: <ul style="list-style-type: none">DH1 - Unit is a multiplexerDJ1 - Unit is a DJ11RMT - Unit is remoteHFF - Unit handles hardware form feedsNEC - Solicited input not echoed |

ANALYSIS LISTINGS

Item	Description
CRT	- Unit is a CRT
ESC	- Unit generates escape sequences
-LOG	- User not logged in on terminal
SLV	- Unit is a slave terminal
DZ1	- Unit is a DZ11
HLD	- Terminal is in hold screen mode
AT.	- MCR command AT. is being processed
PRV	- Unit is a privileged terminal
L3S	- Unit is a LA30S terminal
VT5	- Unit is a VT05B terminal
LWC	- Lowercase to uppercase conversion
15.	Terminal status word, using the following three-letter codes:
	RST - Read with special terminators in progress
	RUB - Rubout sequence (non-CRT) in progress
	ESC - Escape sequence in progress
	RAL - Read pass all in progress
	RNE - Echo suppressed
	CTO - Output disabled
	OBY - Output busy
	IBY - Input busy
	BEL - Bell pending
	DPR - Defer processing of character in buffer
	DEC - Defer echo of character in buffer
	DSI - Input processing disabled
	CTS - Output stopped by CTRL-S
	USI - Unsolicited input in progress
	OBF - Buffered output in progress
	IBF - Buffered input in progress

ANALYSIS LISTINGS

Item	Description
16.	Second terminal status word using the following three-letter codes: ACR - Wrap-around required CR - Trailing carriage return required on output BRQ - Break-through write is queued WRA - Control for wraparound SRQ - Special request is queued WRB - Low bit in 52-WRA bit pattern ORQ - Output request is queued IRQ - Input request is queued HFL - Horizontal fill required VFL - Vertical fill required HHT - Hardware horizontal tab is present HFF - Hardware form-feed is present FLF - Force line feed before next echo FDX - Line is full duplex mode
17.	Fourth terminal status word, using the following three-letter codes: RAL - Terminal is in read-pass-all mode WES - Task waiting for escape sequence RPO - Read with prompt output in progress TAB - Type-ahead buffer allocation requested 8BC - Pass eight bits on input ABD - Autobaud speed detection enabled RCU - Restore cursor ABP - Autobaud speed detection in progress WAL - Terminal is in write-pass-all mode VER - Last character in type-ahead buffer has a parity error

ANALYSIS LISTINGS

Item	Description
BCC	- Last character in type-ahead buffer has a framing error
DAO	- Last character in type-ahead buffer has a data overrun error
PCU	- Position cursor

NOTE

On RSX-11M systems that use the half-duplex terminal driver, CDA dumps two terminal status words.

UNIT CONTROL BLOCK

18. Octal dump of Unit Control Block (UCB), including negative offsets, and octal dump of UCB extension if a UCB extension is present

DEVICE CONTROL BLOCK

19. Octal dump of Device Control Block

STATUS CONTROL BLOCK

20. Octal dump of Status Control Block

I/O REQUEST PACKETS

21. Address of the first word of the I/O packet
22. Name of the task requesting I/O
23. Priority of the task requesting I/O
24. Event flag number used to signal I/O completion
25. Logical unit number used by requesting task

NOTE

If the task was checkpointed while the packet was queued, this number may not be correct. If the address in I.LN2 is within the task header, the logical unit number is correct.

26. I/O function codes (for detailed information on the legal I/O function codes for each device, refer to the RSX-11M-PLUS I/O Drivers Reference Manual)
27. Status of the I/O request - current or queued
28. Octal dump of I/O request packet in offset mode
29. I.LN2 - pointer to the second word of the LUN

ANALYSIS LISTINGS

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TT11:

UCB ADR	DCB ADR	SCB ADR	REDIRECT	ACP	ATT	OWNER	LOGIN UIC
040474	037630	044266	-----	---	---	...	[7,37]

U.STS;

U.ST2;

U.CTL; QUE PWF ATT KIL

U.CW1; TTY CCL REC

U.CW2; DH1 CRT PRV LWC

U.TSTA; IBY IBF

U.TSTA+2; ACR ORQ IRQ HHT FLF

U.TSTA+4; TAB

UNIT CONTROL BLOCK:

040466	000000	003437	000000	037630	040474	000474	000010	000007
040506	102011	000335	000120	044266	056604	145100	100200	050301
040526	000100	141730	000030	000001	013400	003437	000015	000004
040546	000000	000000	000000					

UNIT CONTROL BLOCK EXTENSION:

145100	075670	146730	146734	000044	000054	146730	000000	000000
145120	127147	000001	146734	146470	000000	000000	002400	000022
145140	000000	013400	000000	023531				

DEVICE CONTROL BLOCK:

037630	044434	037674	052124	030001	000060	121274	163177	000130
037650	160000	000000	000007	000000	000001	000006	114670	

STATUS CONTROL BLOCK:

044260	100200	000011	000004	000000	044266	034240	001000	000000
044300	160020	067454	031000	170500	000000	000000	001200	000000
044320	044316	035240	001000	000002	160040			

I/O REQUEST PACKETS:

PACKET ADR	REQUESTOR	PRI	EFN	LUN	FUNCTION CODE	STATUS
075670	...	65.	32.	5.	IO,RLB	INPUT
000000	000000	020101	056604	074354	040474	001000
000020	140020	000000	000572	140040	000120	100000
000040	000000	075624				

Figure 3-17 Device Information and I/O Packet (Truncated)

ANALYSIS LISTINGS

3.2.8 System Task Directory

CDA scans the System Task Directory and outputs the information contained in Figure 3-18. The information in this format is identical to the first 17 items described in Figure 3-11 of this manual.

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SYSTEM TASK DIRECTORY

. LDR.

TCB ADDRESS = 041572 PAR = LDR PCB ADDRESS = 041536
LOAD ADDRESS = 00000000 LOAD DEVICE = LB0 LBN = 00000000
PRI = 248. I/O COUNT = 0. UIC = [1,1] TI = CO0
MAX SIZE = 000000 EVENT FLAGS = <1-16> 000001 <17-32> 000000
T.STAT:
T.ST2: -CHK FXD STP
T.ST3: PRV

000000	000000	000370	000000	127414	015754	000000	041604	000000
000020	041610	000001	000000	041304	114564	000000	022020	010000
000040	000370	000000	041354	041536	000000	115264	000000	041646
000060	000000	000000	000000	041656	000000	041662	000000	000000

TKTN

TCB ADDRESS = 114564 PAR = SYSPAR PCB ADDRESS = 117074
LOAD ADDRESS = 00137200 LOAD DEVICE = LB0 LBN = 00057410
PRI = 248. I/O COUNT = 0. UIC = [0,0] TI = NONE
MAX SIZE = 000105 EVENT FLAGS = <1-16> 000000 <17-32> 000000
T.STAT: -EXE OUT
T.ST2:
T.ST3: -PMD PRV CAL

000000	000000	000370	000000	077314	053600	000000	114576	000000
000020	114602	000000	000000	000000	116064	100400	000000	050100
000040	000370	057410	041354	117074	000105	000000	000000	000000
000060	114642	000000	000000	000000	114652	000000	114656	000000

Figure 3-18 System Task Directory (Truncated)

ANALYSIS LISTINGS

3.2.9 Pool Dump

As shown in Figure 3-19, CDA prints the system pool in octal, Radix-50, and ASCII. On RSX-11M-PLUS systems with secondary pool support, CDA prints a dump of secondary pool with the /SECPOL switch. If a line is repeated more than nine times, CDA prints it once and then prints a message indicating the number of identical lines.

The symbols in Figure 3-19 have the following meanings:

- * Indicates that the next word is allocated.
- + Indicates that the next word is contained in an unused, preallocated I/O packet (in \$PKAVL free list).

NOTE

\$PKAVL is a list containing fixed-size blocks. The blocks in this list are used for fast allocation, and I.LGTH determines the length of these blocks.

- Indicates that the next word is allocated in both \$CRAVL and \$PKAVL. (This is an error condition).

NOTE

\$CRAVL is the free pool list head.

ANALYSIS LISTINGS

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SYSTEM POOL

* = NEXT WORD ALLOCATED FIRST FREE BLOCK (\$CRAVL) = 041760
 + = NEXT WORD IS IN \$PKAVL LIST \$PKAVL = 042120
 - = NEXT WORD IS IN \$PKAVL AND ALSO IN \$CRAVL

```

041674 * 000000 * 042710 * 042164 * 042164 I KFX J8D J8D11 HEtDtD1
041704 * 000400 * 000002 * 003204 * 000407 I FP B AA. FW11 I
041714 * 000007 * 002400 * 002112 * 000401 I G 2 $R FQ11 J I
041724 * 000000 * 000030 * 160000 * 000000 I X 53X 11 I
041734 * 177400 * 002347 * 051522 * 030530 I 2 10 MMJ G5211 g RSX11
041744 * 046461 * 046102 * 032462 * 000000 I LNA LHB HTR 111MBL25 I
041754 * 000000 * 044506 * 042014 * 000004 I K.8 J5T D11 FI D I
041764 * 000000 * 000225 * 115764 * 000000 I C/ X8D 11 t I
041774 * 000003 * 117074 * 041764 * 000240 I C YL. J46 D 11 < tC I
042004 * 115264 * 000000 * 000003 * 117074 IX0D C YL.114 < I
042014 042064 000004 + 042264 + 000044 IJ6T D J9. 6114D 4DS I
042024 + 000020 + 000000 + 040212 + 001010 I P JMB M 11 0 I
042034 + 121200 + 002111 + 140000 + 000000 IZ $Q 0.2 11 "I 0 I
042044 + 000020 + 012054 + 001350 + 000000 I P CID RX 11 , h I
042054 + 000553 + 001016 + 000000 + 000000 I IC MF 11 k I
042064 042240 000034 115264 007422 IJ9H . X0D BPR11 D 4 I
042074 000000 000000 100000 115306 I TSH X0V11 F I
042104 042240 000014 000000 000000 IJ9H L 11 D I
042114 000003 000011 + 042020 + 000044 I C I J5X 611 DS I
042124 + 000020 + 000000 + 041016 + 000400 I P JV0 FPI1 8 I
042134 + 120426 + 001376 + 140026 + 000000 IY08 SF 0/N 11 11 0 I
042144 + 001412 + 140047 + 000003 + 000000 I SR 0/1 C 11 11 0 I
042154 + 000000 + 000000 + 000000 + 041260 I JZ211 0B1
042164 * 000000 * 000001 * 000001 * 000000 I A A 11 I
042174 * 000401 * 000000 * 000000 * 000000 I FQ 11 I
042204 * 000003 * 000000 * 000000 * 000000 I C 11 I
042214 * 002112 * 000401 * 000000 * 000000 I SR FQ 11J I
042224 * 000000 * 000000 * 000000 * 000001 I A11 I
042234 * 000000 * 122022 * 042330 * 000024 I ZJB K X T11 SXD I
042244 115264 005374 000000 000000 IX0D A0L 114 I
042254 100000 115306 042760 000004 ITSH X0V KGX D11 F DE I
042264 + 042504 + 002114 + 140054 + 000000 IKCL ST 0/6 11DEL ,0 I
042274 + 040212 + 001000 + 120636 + 001400 IJMB L2 Y4N SH11 0 I
042304 + 140036 + 000000 + 000000 + 141750 I0/V 1M211 0 hC1
042314 + 001000 + 000000 + 000040 + 000025 I L2 2 U11 I
042324 + 000000 + 000020 * 042550 * 000154 I P KDH B.11 HE1 I
042334 050061 020105 030066 000415 IL3I EFU G.V F/111PE 60 I
042344 170017 120374 120252 000000 I8PO Y0L Y.J 11 pl * I
042354 000000 120712 000016 000000 I Y5R N 11 JI I
042364 000000 000000 000000 000000 I 11 I
042374 042436 000001 000000 000000 IKBN A 11 E I
042404 123550 000000 000375 000000 IZ1P FM 11h' } I
042414 000000 000000 000000 042500 I KCH11 0E1 I
042424 000002 040212 000000 041354 I B JMB J.L11 0 1B1 I
042434 000000 000001 117074 120000 I A YL. YX 11 < I
042444 130477 041764 000105 000000 I.NO J46 A/ 11?1tCE I

```

Figure 3-19 Pool Dump (Truncated)

ANALYSIS LISTINGS

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SECONDARY POOL DUMP

SECONDARY POOL

NUMBER OF FREE BYTES = 00037500 FIRST FREE BYTE = 00656700

LENGTH = 00120000 BYTES

START ADDRESS = 00625000

ENDING ADDRESS = 00627500

00625000	000000	000101	000000	131574	I	AY	...	11	A	131
00625010	003273	000000	140012	000000	I	ACC	0/B	11	0	I
00625020	140016	002040	000000	000000	I	0/F	ZP	11	0	I
00625030	006314	100000	020000	050000	I	BA6	TSH ED2	L2	11L	PI
00625040	001101	041072	042334	113634	I	NO	JW4 K	XJL	11A	1B\D
00625050	000415	000000	000000	140054	I	F/		0/6	11	01
00625060	000010	000002	000000	000000	I	H	B	11		I
00625070	000000	000143	000002	000000	I	BS	B	11	c	I
00625100	000000	140100	000000	140104	I	00P		00T	11	00 D0
00625110	000000	000000	000000	000000	I			11		I
00625120	000000	000000	000000	000000	I			11		I
00625130	000000	000000	000000	000000	I			11		I
00625140	000000	000000	000000	000000	I			11		I
00625150	000000	000000	000000	000000	I			11		I
00625160	000000	000000	000000	000000	I			11		I
00625170	000000	000000	000000	000000	I			11		I
00625200	000000	000106	000000	131574	I	AO	...	11	F	131
00625210	003313	000000	140012	000000	I	ACS	0/B	11K	0	I
00625220	140016	001660	000000	000000	I	0/F	WX	11	00	I
00625230	006651	100000	020000	050000	I	BGO	TSH ED2	L2	11)	PI
00625240	000506	002346	042334	113634	I	HF	1N K	XJL	11F	1\D
00625250	000164	000000	000000	140054	I	B6		0/6	11t	01
00625260	000010	000002	000000	000000	I	H	B	11		I
00625270	000000	000162	000002	000000	I	B4	B	11	r	I
00625300	000000	140100	000000	140104	I	00P		00T	11	00 D0
00625310	000000	000000	000000	000000	I			11		I
00625320	000000	000000	000000	000000	I			11		I
00625330	000000	000000	000000	000000	I			11		I
00625340	000000	000000	000000	000000	I			11		I
00625350	000000	000000	000000	000000	I			11		I
00625360	000000	000000	000000	000000	I			11		I
00625370	000000	000000	000000	000000	I			11		I
00625400	000000	141504	141510	000044	I	11. 112	611	DCHCS		I
00625410	000120	141504	000000	000000	I	B 11.		11P DC		I
00625420	022126	000000	000000	142514	I	E2V		1V. 11VS	LEI	I
00625430	000000	000000	000400	000072	I		FP	ARI		I
00625440	000000	022126	000000	047517	I	E2V		LSW	11 VS	00I
00625450	053000	015563	071517	047433	I	MOP	DOS RQ9	LZK	11 Vs Os	01
00625460	047563	047563	047560	047560	I	L.S	L.S L.P	L.P	11sOsOpOp0	I
00625470	047520	077560	077577	077577	I	LSX	TOX TO9	TO9	11POp	I
00625500	077577	077577	077564	077577	I	TO9	TO9 TO.	TO9	11	t I
00625510	077541	077577	077577	077577	I	TOI	TO9 TO9	TO9	11a	I
00625520	077577	077577	077577	077577	I	TO9	TO9 TO9	TO9	11	I
00625530	077577	077577	077577	077577	I	TO9	TO9 TO9	TO9	11	I

Figure 3-19 (Cont.) Pool Dump (Truncated)

ANALYSIS LISTINGS

3.2.11 Clock Queue

The example in Figure 3-21 shows a clock queue listing. The following list explains the example.

Item	Description
1.	Address of the clock queue entry
2.	Types of time schedule requests One of the following types: <div style="margin-left: 40px;">Type 0 - Mark time request</div> <div style="margin-left: 40px;">Type 2 - Request with periodic rescheduling</div> <div style="margin-left: 40px;">Type 4 - Single-shot task request</div> <div style="margin-left: 40px;">Type 6 - Single-shot internal system subroutine with system subroutine identification</div> <div style="margin-left: 40px;">Type 10- Single-shot internal system subroutine, without system subroutine identification</div> <div style="margin-left: 40px;">Type 12- Clear stop bit (Shuffler)</div>
3.	Task Control Block address or system subroutine identification
4.	Task issuing the clock request
5.	The hour, minute, and second that time request comes due
6.	This field varies with each type of time schedule request <div style="margin-left: 40px;">For a Mark Time request, the labels are: <div style="margin-left: 40px;">C.AST - AST address</div> <div style="margin-left: 40px;">C.SRC - Event flag mask word</div> <div style="margin-left: 40px;">C.DST - Event flag mask address</div> <div style="margin-left: 40px;">Event Flag Number</div> </div> <div style="margin-left: 40px;">For a periodic rescheduling request, the labels are: <div style="margin-left: 40px;">C.RSI - Reschedule internal</div> <div style="margin-left: 40px;">C.UIC - Scheduling UIC</div> </div> <div style="margin-left: 40px;">The field for a single-shot task request contains only one label: <div style="margin-left: 40px;">C.UIC - Scheduling UIC</div> </div> <div style="margin-left: 40px;">The field for a single-shot internal subroutine (both with and without system subroutine identification) contains: <div style="margin-left: 40px;">C.SUB - Subroutine address</div> <div style="margin-left: 40px;">C.AR5 - Relocation base address (for loadable drivers)</div> </div>
7.	Octal dump of clock queue in offset mode

ANALYSIS LISTINGS

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CLOCK QUEUE

```

      ①      ②      ③      ④
ADDRESS = 054210 REQUEST TYPE = 0 TCB = 107134 TASK = TKTN
TIME REQUEST BECOMES DUE = 09:54:06.8 ⑤
C.AST = 000000 C.SRC = 100000 C.DST = 107156 EVENT FLAG = 16. ⑥

000000 057250 010000 107134 011374 000000 000000 100000 107156 } ⑦

ADDRESS = 057250 REQUEST TYPE = 0 TCB = 053510 TASK = PMT...
TIME REQUEST BECOMES DUE = 09:54:10.2
C.AST = 124602 C.SRC = 000002 C.DST = 053532 EVENT FLAG = 2.

000000 046760 001000 053510 011707 000000 124602 000002 053532

ADDRESS = 046760 REQUEST TYPE = 0 TCB = 053510 TASK = PMT...
TIME REQUEST BECOMES DUE = 09:54:50.2
C.AST = 000000 C.SRC = 000004 C.DST = 053532 EVENT FLAG = 3.

000000 000000 001400 053510 016447 000000 000000 000004 053532

```

Figure 3-21 Clock Queue

3.2.12 Controller Information

Figure 3-22 shows the information associated with a device controller. This information appears only in crash dumps of RSX-11M-PLUS systems. The following list explains the items in Figure 3-22.

Item	Description
1.	Name of the device controller
2.	Address of the Controller Table (CTB)
3.	Address of the Device Controller Block (DCB) for this device
4.	CTB status byte, which may contain any of the following three-letter status codes: <ul style="list-style-type: none"> CLK - Clock block appears at the top of the CTB MDC - Multidriver CTB CBL - Clock block is linked into the clock queue CIN - Controller uses the common interrupt dispatch table NET - DECnet device
5.	Octal dump of the CTB
6.	Common Interrupt Address

ANALYSIS LISTINGS

- | Item | Description |
|------|---|
| 7. | DCB for each device interfaced by this controller |
| 8. | Name of each device interfaced by this controller |
| 9. | Address of the Controller Request Block (KRB) |
| 10. | Controller status. The following is a list of possible status values and their meanings: <ul style="list-style-type: none"> OFL - Controller is off line MOF - Controller is marked for off line UOP - Controller supports overlapped operations MBC - Device is a MASSBUS controller SDX - Seek operations allowed during data transfers POE - Parallel operations enabled UCB - UCB table present DIP - Data transfer in progress PDF - Privileged diagnostic functions only |
| 11. | Octal dump of KRB in one or two parts |

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CONTROLLER INFORMATION

RH (1)
-- (2) (3)
CTB ADDRESS = 020454 L.DCB = 022020
(4) L.STS: MDC CIN
CONTROLLER TABLE BLOCK
020454 022020 044122 022020 005004 022044 022102 022134 022160 } (5)

DEVICES INTERFACED BY THIS CONTROLLER
COMMON INTERRUPT ADDRESS = 017526 (6)

(7) DCB DEVICE NAME (8)

020474 DB
021142 DR
021410 DS
021616 MM

KRB ADDRESS = 022044 (9)
K.STS: SDX UOP MBC POE UCB DIP (10)

022026	021410	021616	000000	177777	025640	000400	000374	176700
022046	000016	000003	020534	021112	021112	000050	020534	020602
022066	020650	020716	177777	015240				
022046	000016	000003	020534	021112	021112	000050	020534	020602
022066	020650	020716						

} (11)

KRB ADDRESS = 022102
K.STS: SDX UOP MBC POE UCB

022064	020602	020650	020716	177777	015240	000002	000174	176300
022104	000016	000001	000000	000000	022112	000050	021202	021252
022124	177777	020640	000004	000030				
022104	000016	000001	000000	000000	022112	000050	021202	021252

Figure 3-22 Controller Information

ANALYSIS LISTINGS

KRB ADDRESS = 022134

K.STS: SDX MBC

022116	000050	021202	021252	177777	020640	000004	000030	172040
022136	000016	000001	021516	000000	022144	000030	022640	000006
022156	000030	172440	000016	000000				
022136	000016	000001	021516	000000	022144	000030	022640	000006

KRB ADDRESS = 022160

K.STS: SDX MBC

022142	021516	000000	022144	000030	022640	000006	000030	172440
022162	000016	000000	000000	000000	022170	000034	004270	022454
022202	045504	022212	000001	022372				
022162	000016	000000	000000	000000	022170	000034	004270	

Figure 3-22 (Cont.) Controller Information

3.2.13 Kernel Data Space

Figure 3-23 shows a dump of kernel data space from the specified starting virtual address to the specified ending virtual address.

3.2.14 Kernel Instruction Space

Figure 3-24 shows a dump of kernel instruction space from the specified starting virtual address to the specified ending virtual address.

3.2.15 Task Data Space

Figure 3-25 shows a dump of task data space. This dump occurs only on RSX-11M-PLUS systems.

3.2.16 Task Instruction Space

Figure 3-26 shows a dump of task instruction space. This dump occurs only on RSX-11M-PLUS systems.

ANALYSIS LISTINGS

RSX-11M-PLUS CRASH DUMP ANALYZER V3.0 2-MAY-85 12:51 PAGE 6
 KERNEL DATA SPACE DUMP

VIRTUAL ADDRESS: 001000 PHYSICAL ADDRESS: 00001000

001000 000000 000000 000000 000000 I II I

[ABOVE LINE REPEATED 28. TIMES]

001350	000000	000000	020422	000000	I	EKZ	II	I	I
001360	177400	000000	000000	020416	I 2	EKVII	II	II	
001370	005015	025052	042452	042530	IAXM F/4	KBZ KC2II	***EXE	I	
001400	020103	040520	044522	054524	IEFS JR	K/J NK,II	C PARITY	I	
001410	042440	051122	051117	051440	IKBP MF4	MF1 ML II	ERROR S	I	
001420	047524	025120	025052	005015	ILS, F02	F/4 AXMI	TOP***	I	
001430	000012	177777	172020	003110	I J 80	98 A HI	TH	I	
001440	160377	177401	000366	000000	IS99 2A	FF	II	v	I
001450	000001	001450	001450	001450	I A TH	TH THII	(((I	
001460	001450	001450	001450	001450	I TH TH	TH THII	(((I	
001470	001450	001450	001450	001450	I TH TH	TH THII	(((I	
001500	001450	001450	001450	001450	I TH TH	TH THII	(((I	
001520	177746	177750	177752	177766	I 70 72	74 8FII	f h j v	I	
001530	000000	000000	000000	000000	I	II		I	
001540	000000	000000	050044	000000	I	L26	II	SP	I
001550	120030	000000	000000	000001	IYXX	AI		I	
001560	000001	042220	005015	041412	I A J82	AXM J/BII	D C	I	
001570	040522	044123	026440	020055	IJR8 KV5	GH2 EE7II	RASH --	I	
001600	047503	052116	053440	052111	ILSK MSV	M7X MSQII	CONT WIT	I	
001610	020110	041523	040522	041524	IEFX J05	JR8 J06II	H SCRATC	I	
001620	020110	042515	044504	020101	IEFX KCU	K.6 EFQII	H MEDIA	I	
001630	047117	042040	030113	005015	ILUG J6	G/C AXMI	ION DK0	I	
001640	000012	005015	051103	051501	I J AXM	MFS ML3II	CRAS	I	
001650	020110	026455	044440	020117	IEFX GIE	K, EF1II	H -- IO	I	
001660	051105	047522	020122	047117	IMFU LSZ	EF4 LUGII	ERROR ON	I	
001670	041440	040522	044123	042040	IJ/X JR8	KV5 J6 II	CRASH D	I	
001700	046525	020120	042504	044526	ILN7 EF2	KCL K/NII	UMP DEV	I	
001710	042503	006400	041412	040522	IKCK BCH	J/B JRBI	ICE CRA	I	
001720	044123	026440	020055	040523	IKV5 GH2	EE7 JRCII	ISH -- SA	I	
001730	044516	054524	052040	046511	IK/F NK,	MRP LNYII	INITY TIM	I	
001740	051105	042440	050130	051111	IMFU KBP	L4H MFYII	ER EXPIR	I	
001750	042105	047440	020116	051120	IJ67 Lzp	EF0 MF2II	ED ON PR	I	
001760	041517	051505	047523	020122	IJ01 ML7	LS\$ EF4II	PROCESSOR	I	
001770	050103	006400	041412	040522	IL3\$ BCH	J/B JRBI	ICP CRA	I	
002000	044123	026440	000003	116301	IKV5 GH2	C YCII	ISH - A	I	

[END OF ANALYSIS OUTPUT]

Figure 3-23 Kernel Data Space

ANALYSIS LISTINGS

RSX-11M-PLUS CRASH DUMP ANALYZER V3.0 2-MAY-85 12:51 PAGE 5
 KERNEL INSTRUCTION SPACE DUMP

VIRTUAL ADDRESS: 001000 PHYSICAL ADDRESS: 00001000

001000 000000 000000 000000 000000 1 11 1

[ABOVE LINE REPEATED 28. TIMES]

001350	000000	000000	020422	000000	1	EKZ	11	1	1
001360	177400	000000	000000	020416	1	2	EKV11	11	11
001370	005015	025052	042452	042530	1	AXM F/4 KBZ	KC211	***EXE1	11
001400	020103	040520	044522	054524	1	EFS JR K/J	NK.11C	PARITY1	11
001410	042440	051122	051117	051440	1	KBP MF4 MF1	ML 11	ERROR S1	11
001420	047524	025120	025052	005015	1	LS. F02 F/4	AXM11TOP	***	1
001430	000012	177777	172020	003110	1	J 80 9B	A H11	TH 1	1
001440	160377	177401	000366	000000	1	599 2A FF	11	v 1	1
001450	000001	001450	001450	001450	1	A TH TH	TH11	(((1	1
001460	001450	001450	001450	001450	1	TH TH TH	TH11	(((1	1
001470	001450	001450	001450	001450	1	TH TH TH	TH11	(((1	1
001500	001450	001450	001450	001450	1	TH TH TH	TH11	(((1	1
001520	177746	177750	177752	177766	1	70 72 74	8F11f	h J v 1	1
001530	000000	000000	000000	000000	1		11	1	1
001540	000000	000000	050044	000000	1	L26	11	\$P 1	1
001550	120030	000000	000000	000001	1	YXX	11	1	1
001560	000001	042220	005015	041412	1	A J82 AXM	J/B11	D C1	1
001570	040522	044123	026440	020055	1	JRB KVS GH2	EE711RASH	-- 1	1
001600	047503	052116	053440	052111	1	LSK MSV M7X	MSQ11CONT	WIT1	1
001610	020110	041523	040522	041524	1	EFX J05 JRB	J0611H	SCRATC1	1
001620	020110	042515	044504	020101	1	EFX KCU K.6	EFQ11H	MEDIA 1	1
001630	047117	042040	030113	005015	1	LUG J6 G/C	AXM11ON	DK0 1	1
001640	000012	005015	051103	051501	1	J AXM MFS	ML311	CRAS1	1
001650	020110	026455	044440	020117	1	EFX GIE K.	EF111H	-- IO 1	1
001660	051105	047522	020122	047117	1	MFU LSZ EF4	LUG11ERROR	ON1	1
001670	041440	040522	044123	042040	1	J/X JRB KVS	J6 11	CRASH D1	1
001700	046525	020120	042504	044526	1	LN7 EF2 KCL	K/N11UMP	DEV11	1
001710	042503	006400	041412	040522	1	KCK BCH J/B	JRB11CE	CRA1	1
001720	044123	026440	020055	040523	1	KV5 GH2 EE7	JRC11SH	-- SA1	1
001730	044516	054524	052040	046511	1	K/F NK. MRP	LN11INITY	TIM1	1
001740	051105	042440	050130	051111	1	MFU KBP L4H	MFY11ER	EXPIR1	1
001750	042105	047440	020116	051120	1	J67 LZP EF0	MF211ED	ON PR1	1
001760	041517	051505	047523	020122	1	J01 ML7 LS\$	EF411OCESSOR	1	1
001770	050103	006400	041412	040522	1	LS\$ BCH J/B	JRB11CP	CRA1	1
002000	044123	026440	000003	116301	1	KV5 GH2 C	YC111SH	- A 1	1

Figure 3-24 Kernel Instruction Space

ANALYSIS LISTINGS

RSX-11M-PLUS CRASH DUMP ANALYZER

V3.0

2-MAY-85

16113

PAGE 1

TASK DUMP OF LITT27

DATA SPACE

TCB ADDRESS = 042204

HEADER ADDRESS = 011323

WINDOW BLOCKS:

PAR	VIRT LIMITS	ATT DESC	WND SIZE	OFFSET	1ST PDR	NO.	LAST PDR
GEN	000000 002077	040030	000021	000015	177620	1	010006
	160000 160177	041040	000002	000010	177636	1	000402

WINDOW #2 -- TASK VIRTUAL LIMITS 000000-002077

PHYSICAL STARTING ADDRESS = 01134000

000000	000000	000252	140313	160400	!	DJ 035 6	!!	* K0 a!
000010	003471	003471	170017	160000	!AFI	AFI 8PO 53X	!!	9 p '!
000020	001334	000000	000000	000000	! RL		!!	!
000030	000000	000000	000000	000000	!		!!	!
000040	000000	140252	140126	000001	!	03B 008	!!	*0V0 !
000050	000000	000000	000000	000000	!		!!	!
000060	000000	000000	000000	000000	!		!!	!
000070	000000	140250	000006	022520	!	03 F E82	!!	(0 P%!
000100	000000	022520	000000	022520	!	E82	!!	P% P%!
000110	000000	022520	000000	037462	!	E82	!!	JDR!! P% 2?!
000120	000000	037506	000000	000004	!	JD8	!!	D!! F? !
000130	107544	000000	001077	000000	!V7.	NO	!!	id ? !
000140	000011	000004	000600	004006	! I	D IX AKN	!!	!! !
000150	107544	000000	002077	000000	!V7.	\$G	!!	id ? !
000160	000021	000021	000620	010006	! Q	Q J BVV	!!	!! !
000170	040144	160000	160577	000000	!JLD	53X 6CG	!!	id ' a !
000200	000006	000000	000616	002402	! F	I8 28	!!	!! !
000210	040144	160000	160177	000000	!JLD	53X 561	!!	id ' ' !
000220	000002	000010	000636	000402	! B	H JN FR	!!	!! !
000230	017747	000004	000000	160400	!EDG	D	6	!!
000240	140313	046174	131574	000000	!035	LIT ...	!!	K0!L13 !
000250	000000	000000	000000	000000	!		!!	!! !

[ABOVE LINE REPEATED 63. TIMES]

:

Figure 3-25 Task Data Space

ANALYSIS LISTINGS

RSX-11M-PLUS CRASH DUMP ANALYZER V3.0 2-MAY-85 13:46
TASK DUMP

PAGE 1

TASK DUMP OF ...LDR

INSTRUCTION SPACE

TCB ADDRESS = 117300

HEADER ADDRESS = 117130

WINDOW BLOCKS:

PAR	VIRT LIMITS	ATT DESC	WND SIZE	OFFSET	1ST PDR	NO.	LAST PDR
SYSPAR	120000 123777	117114	000040	000000	177612	1	017406

WINDOW #1 -- TASK VIRTUAL LIMITS 120000-123777

PHYSICAL STARTING ADDRESS = 00530100

120000	000000	000146	140664	140630	!	BV 09. 09	!!	f 4A A!
120010	000424	000424	170017	120226	!	F6 F6 8PO YS0	!!	D !
120020	120166	000000	000000	000000	!	YZ8	!!	v !
120030	000000	000000	000000	000000	!		!!	!
120040	000000	000000	000102	000000	!		!!	!
120050	000000	000000	000000	000000	!	AZ	!!	B !
120060	000000	000000	000000	000000	!		!!	!
120070	000000	000144	000001	037602	!	BT A JFR	!!	d ?!
120100	000000	000001	117610	120000	!	A YU YX	!!	!
120110	123777	000000	000040	000000	!	Z5G 2	!!	!
120120	000612	017406	000143	000003	!	I4 D8V BS C	!!	c !
120130	000000	140630	140664	045662	!	09 09. LDR	!!	A4A2K!
120140	131574	000000	000000	000000	!	...	!!	13 !
120150	000000	000000	000000	140630	!		!!	09 !
120160	000002	120166	102700	006003	!	B YZ8 UP A65	!!	v !
120170	001000	000001	000001	120214	!	L2 A A YST	!!	!
120200	000000	140000	101700	000000	!	0.2 UCH	!!	00 !
120210	000000	000000	047660	000000	!	L0	!!	00 !
120220	000000	000000	031401	104376	!	HFQ U60	!!	3- !
120230	120454	005067	100570	016700	!	Y1T AYO T.X D0P	!!	17 x !
120240	061024	062700	000012	004767	!	OS. PKH J AW1	!!	b0e w !
:								
:								
:								

Figure 3-26 Task Instruction Space

CHAPTER 4

INTERPRETING A CRASH DUMP LISTING

This chapter introduces basic concepts that can help you to use CDA output listings to analyze the cause of a system crash. However, this chapter is not intended as a complete guide to interpreting a crash dump.

4.1 HELPFUL CONCEPTS

Two concepts are helpful in using CDA output listings to determine the cause of a system failure:

- Determining what was mapped at the time of the crash
- Interpreting stack depth and the kernel stack

4.1.1 Determining What Was Mapped

To determine what was mapped at the time of the crash, look at the dump of the Kernel Page Address Registers on the first page of the CDA listing (instruction space registers on RSX-11M systems, both instruction and data space registers on RSX-11M-PLUS systems). This listing, titled Volatile Registers, is shown in Figure 3-1.

Figure 4-1 is an example of the listing of the contents of the sixth and seventh words from a Kernel Page Address Registers dump. The contents of the sixth and seventh words are the block numbers of the task or driver that was mapped at the time of the crash. You can determine what occupied that portion of memory from the memory map on the first page of partition information in the CDA output listing. Look under the BASE heading (for the base address of the mapped partition).

You can use this information, along with data from the kernel stack and system common listings, to analyze the state of the system at the time of the crash.

INTERPRETING A CRASH DUMP LISTING

K E R N E L

I S P A C E		D S P A C E	
PDR	PAR	PDR	PAR
077506	000000	000000	000000
077506	000200	000000	000000
077506	000400	000000	000000
077406	000600	000000	000000
077506	001000	000000	000000
077406	001372	000000	000000
077406	002077	000000	000000
077506	007600	000000	000000

Figure 4-1 Kernel Page Address Registers

4.1.2 Interpreting the Kernel Stack

\$STKDP, which appears on the first page of the system common listing, is the system stack depth indicator. The value of the stack depth indicator shows which state the system was in when it crashed. The following lists shows the possible values of the stack depth indicator and the corresponding system states.

\$STKDP = 1 Indicates User state
 \$STKDP = 0 Indicates System state
 \$STKDP = -1,-2,-3,-4,... Indicates Interrupt state

Note that when the system is in Interrupt state, the stack depth value is negative. Two types of interrupt conditions can decrement stack depth:

1. A synchronous system trap (SST), which can be caused by any of the following:
 - A directive
 - A TRAP instruction
 - An illegal instruction
 - Another SST
2. The interrupt save routine (\$INTSV)

When an SST occurs, the following information from the current task is pushed onto the stack:

The Processor Status Word (PSW)
 The Program Counter (PC)
 The address of return to DIRSV
 SST specific information
 R5 (Mapped systems only)
 R4 (Mapped systems only)
 R3
 R2
 R1
 R0

INTERPRETING A CRASH DUMP LISTING

When an interrupt occurs, the following are pushed onto the stack:

PSW
PC

If a call to \$INTSV is then issued, the following are pushed onto the stack after the PC:

Address of return to \$INTSV
R5
R4

The stack depth is then decremented. If the value of \$STKDP is 0 and the currently mapped driver issues a call to the \$FORK routine, the following items are pushed onto the stack:

Return to \$FORK
R3 (Which replaces the return to \$INTSV)
R2
R1
R0

If the driver issues a call to \$FORK when \$STKDP is not 0, the registers are saved in a fork block, which is queued for later execution.

Since interrupts can still occur, more of both basic types of stack contents (interrupt or \$INTSV) can be pushed. If an SST occurs in the Executive, SST information will be pushed onto the stack, possibly followed by a system crash.

This information, along with the kernel stack pointer SP(K), which appears on the first page of the CDA listing, can be used to interpret the contents of the dump of the kernel stack.

The contents of the PC and the PSW before the crash appear on the first page of the CDA listing. You can compare this information to the contents of the PC and the PSW on the stack to help locate the cause of the crash.

Refer to the RSX-11M Guide to Writing an I/O Driver or to the RSX-11M-PLUS Guide to Writing an I/O Driver for a further description of the contents of the kernel stack.

CDA MESSAGES

If you are a privileged user, you can install CDA and then reenter your command line.

CDA -- ACP out of memory or not in execution

Type: Analysis diagnostic

Explanation: The partition containing the File Control Block (FCB) for the current logical unit number (LUN) was not in memory.

CDA -- Address out of range

Type: Fatal

Explanation: CDA was unable to read a block from the crash-input file. Possible causes for this are:

- A device failure
- A bad block on the volume
- The crashed system had a corrupted data base
- The binary file does not contain all of the crashed system's memory

CDA -- Analysis output must be directed to an explicit device or file

Type: Fatal

Explanation: CDA requires an explicit output file specification. There are no default output file names.

CDA -- Analysis terminated after n. pages

Type: Informational

Explanation: CDA terminated the analysis after generating n pages of analysis output. If you have not specified the /LIMIT switch in the CDA command string, this message indicates that CDA has generated more than 300(decimal) pages of output.

CDA -- Command I/O error

Type: Fatal

Explanation: The system returned an error when CDA attempted to read a command line.

CDA -- Command line syntax error

Type: Fatal

Explanation: CDA detected an error in the syntax of a CDA command line. CDA will point to the beginning of the error within the command line.

CDA MESSAGES

CDA -- Crash dump must be input from an explicit device or file

Type: Fatal

Explanation: The crash dump input file specification must be explicit. There is no default file specification for the crash dump input.

CDA -- Device driver missing

Type: Fatal

Explanation: You have not loaded the driver for the crash dump input device.

CDA -- Dump aborted - kernel PARs clobbered

Type: Fatal

Explanation: This message appears on mapped systems only. It indicates that the values contained in the kernel Page Address Registers are invalid. To restart the analysis, you must specify the /KMR switch. This switch forces CDA to use standard mapping values when converting kernel virtual addresses to physical memory addresses.

CDA -- Error reading crash dump

Type: Fatal

Explanation: The system returned an error when CDA attempted to read the crash dump file. This could be caused by:

- A device failure
- A bad block on the volume
- On RSX-11M-PLUS systems, the device might not be mounted foreign

CDA -- Error reading file filename

Type: Fatal

Explanation: The system returned an error when CDA attempted to read the crash dump file. This could be caused by:

- A device failure
- A bad block on the volume

CDA -- Error reading symbol file filename

Type: Fatal

CDA MESSAGES

Explanation: The system returned an error when CDA attempted to read the symbol table file indicated. Possible causes for the error are:

- A device failure
- A bad block on the volume
- The specified symbol file was not an STB file

CDA -- Errors detected: n.

Type: Informational

Explanation: CDA has detected n analysis errors during the run.

CDA -- Error writing analysis file

Type: Fatal

Explanation: The system returned an error when CDA attempted to write a line into the analysis listing file. This could be caused by:

- A full volume
- A problem with the device
- A bad block on the volume

CDA -- Error writing dump file filename

Type: Fatal

Explanation: The system returned an error when CDA attempted to write into the binary output file. This condition could be caused by:

- A full volume
- A problem with the device
- A bad block on the volume

CDA -- Exiting due to illegal trap - snapshot dump being attempted

Type: Fatal

Explanation: CDA has aborted after detecting an odd address or some other type of fault. If Postmortem Dump (PMD) is installed in the system, the system will generate a snapshot dump. This is an indication of a software problem. If you send a Software Performance Report (SPR) to DIGITAL for this type of failure, you should include any available dumps.

CDA MESSAGES

Also, preserve the following until your SPR is answered:

1. From the crashed system:

- All applicable user task images
- RSX11M.SYS
- RSX11M.STB
- RSXMC.MAC
- All applicable privileged task images
- Crash dump volume

2. From the system used for analysis:

- RSX11M.SYS
- RSX11M.STB
- CDA.TSK

CDA -- Failed to assign LUN to input device ddu

Type: Fatal

Explanation: The Assign LUN (ALUN\$) directive failed when CDA attempted to use it to attach the specified input device before reading the crash dump from the device. ALUN\$ will fail if the device name in the CDA command line is invalid.

CDA -- Failed to extend page buffer - n. pages available

Type: Informational

Explanation: The Extend Task (EXTK\$) directive failed when CDA attempted to use it to expand the page buffer. This problem will cause the analysis to take longer, but the analysis will continue with a buffer of n pages, each 256 words long.

NOTE

CDA uses the Extend Task directive to obtain additional buffering space. CDA does not use space allocated by a /INC= qualifier on the INStall command.

CDA -- Failed to open input file filename

Type: Fatal

Explanation: One of the following conditions exists:

- The specified device does not exist.
- The volume is not mounted.
- A problem exists with the device.

CDA MESSAGES

- The specified UFD does not exist.
- The specified file does not exist.
- You do not have read access privileges.

CDA -- Failed to open output file filename

Type: Fatal

Explanation: One of the following conditions exists:

- The specified device does not exist.
- The volume is not mounted.
- A problem exists with the device.
- The specified UFD does not exist.
- The volume is full or the device is write-protected.
- You do not have write access privilege to UFD.

CDA -- Illegal switch

Type: Fatal

Explanation: You specified an unknown switch or used a legal switch with the wrong file specification. CDA will point to the error within the command line.

CDA -- Inconsistency in dynamic storage

Type: Informational

Explanation: CDA detected an inconsistency while scanning the pool pointers. This condition could be associated with the crash. However, it may mean that you specified the wrong executive symbol table file.

CDA -- Indirect command syntax error

Type: Fatal

Explanation: The name of the indirect command file (@filename) is syntactically incorrect.

CDA -- Indirect file open failure

Type: Fatal

Explanation: CDA could not open an indirect command file specified as "@filename" in the CDA command line.

CDA MESSAGES

CDA -- Invalid address range

Type: Fatal

Explanation: You specified an address that was not consistent with Active Page Register (APR) mapping.

CDA -- List count expired

Type: Analysis diagnostic

Explanation: The linked list of data structures has too many entries. The list may be corrupted, or contains a loop.

CDA -- Maximum indirect file depth exceeded

Type: Fatal

Explanation: You exceeded the maximum allowable number of nested indirect command files. (CDA only permits one indirect command level.)

CDA -- No input file specified

Type: Fatal

Explanation: You did not specify a crash dump input file.

CDA -- No output file specified

Type: Fatal

Explanation: You did not specify an output file.

CDA -- Output dump filename must be explicit

Type: Fatal

Explanation: You did not specify a valid output file.

CDA -- Pool link error found - continuing

Type: Analysis diagnostic

Explanation: CDA detected a link error while scanning the pool free block pointers (\$CRAVL). This condition can be associated with the crash. It can also mean that you specified the wrong Executive symbol table file. If the latter is true, the entire analysis will be meaningless and you should abort CDA.

CDA -- Premature end of dump input - filename being zero-filled

Type: Informational

Explanation: CDA reached the end of the medium (or the end-of-file mark on a magnetic tape) before the crash dump output file had been completely filled. If you expected the file to be completely filled by the dump, this condition could indicate a problem.

CDA MESSAGES

CDA -- Processor n failed to dump its registers

Type: Informational

Explanation: On a multiprocessor system, when the system crashes, each on-line processor is notified by an interrupt. If the processor does not respond to the interrupt (for example, if it halted or is off line), it won't dump its registers into the crash buffer. CDA notes this and prints the informational message.

CDA -- Redirect error (U.RED=0)

Type: Analysis diagnostic

Explanation: CDA detected an error in the pointer to the Unit Control Block (UCB) of a redirected unit. This condition may be associated with the cause of the crash.

CDA -- Symbol symbolname not defined in symbol file

Type: Fatal

Explanation: CDA did not find a symbol that it required for the analysis in the specified Executive symbol table file. You have probably entered the wrong file name or have mistakenly used the default file name.

CDA -- Symbol file filename has illegal format

Type: Fatal

Explanation: The specified Executive symbol table file has an improper format, probably caused by entry of the wrong file name. However, this message could also indicate a problem with the device or medium on which the file is located.

CDA -- Task 'taskname' not in memory

Type: Analysis diagnostic

Explanation: This message can be caused by two conditions:

1. You have requested a dump of a task which does not have an entry in the System Task Directory.
2. The task has an entry in the System Task Directory, but it is marked out of memory.

You can verify the state of the task by examining a dump of the Task Control Blocks.

CDA -- Transfer complete - ddu may be unloaded

Type: Informational

Explanation: The transfer of the crash dump to the output file is finished; you may unload the crash dump device. This message occurs only when you have specified a binary file in the output of the command string to CDA.

CDA MESSAGES

CDA -- Unknown AST type

Type: Analysis diagnostic

Explanation: CDA has detected an AST block which is not one of the following valid types of ASTs:

- Unsolicited character AST
- Buffered I/O AST
- Emit status AST
- Completion AST from:

QIO\$
MRKT\$
SPWN\$
CNCT\$
CINT\$

1. Specified AST from:

SFPA\$
SRDA\$
SRRA\$
SPFA\$

CDA -- Unknown get command line error

Type: Fatal

Explanation: An unrecognized error occurred when CDA attempted to read a command line.

CDA -- \$PKVAL link error at n --FWD PTR = n

Type: Analysis diagnostic

Explanation: CDA detected a link error while scanning the pool free packet list \$PKVAL. This condition can be associated with the crash. It can also mean that you specified the wrong executive symbol table file.

APPENDIX B

RSX-11M SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS

This appendix describes the RSX-11M system macros that supply symbolic offsets for data structures listed in Table B-1.

The data structures are defined by macros in the Executive macro library. To reference any of the data structure offsets from your code, include the macro name in an .MCALL directive and invoke the macro. For example:

```
.MCALL DCBDF$  
DCBDF$ ;Define DCB offsets
```

NOTE

All physical offsets and bit definitions are subject to change in future releases of the operating system. Code that accesses system data structures should always use the symbolic offsets rather than the physical offsets.

The first two arguments, <:> and <=>, make all definitions global. If they are left blank, the definitions will be local.

All of these macros are in the Executive macro library LB:[1,1]EXEMC.MLB. All except ITBDF\$ and MTADF\$ are also in the Executive definition library LB:[1,1]EXELIB.OLB.

Table B-1
Summary of System Data Structure Macros

Macro	Arguments	Data Structures
ABODF\$	<:>,<=>	Task abort and termination notification message codes
CLKDF\$	<:>,<=>	Clock queue control block
DCBDF\$	<:>,<=>	Device Control Block
EPKDF\$	<:>,<=>	Error message block
EVNDF\$	<:>,<=>	Terminal Software Architecture (TSA) event packet definitions

(Continued on next page)

RSX-11M SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS

Table B-1 (Cont.)
Summary of System Data Structure Macros

Macro	Arguments	Data Structures
FL1DF\$	<:,>,<=>	Files-11 data structures (volume control block, mount list entry, file Control Block, file window block, locked block list node)
HDRDF\$	<:,>,<=>	Task header and window block
HWDDF\$	<:,>,<=>	Hardware register addresses and feature mask definitions
ITBDF\$	<:,>,<=>	Interrupt transfer block
LCBDF\$	<:,>,<=>	Logical assignment control block
MTADF\$	<:,>,<=>	ANSI magtape data structures (volume set control block)
PCBDF\$	<:,>,<=>	Partition Control Block and attachment descriptor
PKTDF\$	<:,>,<=>	I/O packet, AST control block, offspring control block, group global event flag control block, and CLI parser block
SCBDF\$	<:,>,<=>	Status Control Block and UMR assignment block
TCBDF\$	<:,>,<=>	Task Control Block
UCBDF\$	<:,>,<=>,TTDEF	Unit Control Block

ABODF\$

```

.MACRO      ABODF$,L,B

;+
; TASK ABORT CODES
;
; NOTE: S.COAD-S.CFLT ARE ALSO SST VECTOR OFFSETS
;-

S.CACT='B'-4.      ;TASK STILL ACTIVE
S.CEXT='B'-2.      ;TASK EXITTED NORMALLY
S.COAD='B'0.       ;ODD ADDRESS AND TRAPS TO 4
S.CSGF='B'2.       ;SEGMENT FAULT
S.CBPT='B'4.       ;BREAK POINT OR TRACE TRAP
S.CIOT='B'6.       ;IOT INSTRUCTION
S.CILI='B'8.       ;ILLEGAL OR RESERVED INSTRUCTION
S.CEMT='B'10.      ;NON RSX EMT INSTRUCTION
S.CTRP='B'12.      ;TRAP INSTRUCTION
S.CFLT='B'14.      ;11/40 FLOATING POINT EXCEPTION
S.CSST='B'16.      ;SST ABORT-BAD STACK
S.CAST='B'18.      ;AST ABORT-BAD STACK
S.CABO='B'20.      ;ABORT VIA DIRECTIVE
S.CLRF='B'22.      ;TASK LOAD REQUEST FAILURE
S.CCRF='B'24.      ;TASK CHECKPOINT READ FAILURE
S.IOMG='B'26.      ;TASK EXIT WITH OUTSTANDING I/O
S.PRTY='B'28.      ;TASK MEMORY PARITY ERROR
S.CPMD='B'30.      ;TASK ABORTED WITH PMD REQUEST
S.CINS='B'32.      ;TASK INSTALLED IN TWO SYSTEMS
;
; TASK TERMINATION NOTIFICATION MESSAGE CODES
;
T.NDNR='B'0        ;DEVICE NOT READY
.NDSE='B'2        ;DEVICE SELECT ERROR
T.NCWF='B'4        ;CHECKPOINT WRITE FAILURE
T.NCRE='B'6        ;CARD READER HARDWARE ERROR
T.NDMO='B'8        ;DISMOUNT COMPLETE
T.NUER='B'10.      ;UNRECOVERABLE ERROR
T.NLDN='B'12.      ;LINK DOWN (NETWORKS)
T.NLUP='B'14.      ;LINK UP (NETWORKS)
T.NCFI='B'16.      ;CHECKPOINT FILE INACTIVE
T.NUDE='B'18.      ;UNRECOVERABLE DEVICE ERROR
T.NMPE='B'20.      ;MEMORY PARITY ERROR
T.NKLF='B'22.      ;UCODE LOADER NOT INSTALLED
T.NDEB='B'24.      ;TASK HAS NO DEBUGGING AID
T.NRCT='B'26.      ;CONTROL TASK NOT INSTALLED
T.NWBL='B'28.      ;WRITE BACK CACHING DATA LOST. UNIT
                  ;WRITE LOCKED
T.NPNT='B'30.      ;REQUIRED PARTITION NOT IN SYSTEM
T.NIOS='B'32.      ;I/O STALLED
T.NIOR='B'34.      ;I/O RESUMING

.MACRO      ABODF$      X,Y
.ENDM
.ENDM

```

CLKDFS

```

.MACRO          CLKDFS,L,B

;+
; CLOCK QUEUE CONTROL BLOCK OFFSET DEFINITIONS
;
; CLOCK QUEUE CONTROL BLOCK
;
; THERE ARE SIX TYPES OF CLOCK QUEUE CONTROL BLOCKS. EACH CONTROL
; BLOCK HAS THE SAME FORMAT IN THE FIRST FIVE WORDS AND DIFFERS
; IN THE REMAINING THREE.
;
; THE FOLLOWING CONTROL BLOCK TYPES ARE DEFINED:
;-

C.MRKT='B'0          ;MARK TIME REQUEST
C.SCHD='B'2          ;TASK REQUEST WITH PERIODIC RESCHEDULING
C.SSHT='B'4          ;SINGLE SHOT TASK REQUEST
C.SYST='B'6          ;SINGLE SHOT INTERNAL SYSTEM SUBROUTINE
                     ;(IDENT)
C.SYTK='B'8.         ;SINGLE SHOT INTERNAL SYSTEM SUBROUTINE
                     ;(TASK)
C.CSTP='B'10.        ;CLEAR STOP BIT (CONDITIONALIZED ON
                     ;SHUFFLING)

;
; CLOCK QUEUE CONTROL BLOCK TYPE INDEPENDENT OFFSET DEFINITIONS
;

.ASECT

.=0
C.LNK:'L' .BLKW 1     ;CLOCK QUEUE THREAD WORD
C.RQT:'L' .BLKB 1     ;REQUEST TYPE
C.EFN:'L' .BLKB 1     ;EVENT FLAG NUMBER (MARK TIME ONLY)
C.TCB:'L' .BLKW 1     ;TCB ADDRESS OR SYSTEM SUBROUTINE
                     ;IDENTIFICATION
C.TIM:'L' .BLKW 2     ;ABSOLUTE TIME WHEN REQUEST COMES DUE

;
; CLOCK QUEUE CONTROL BLOCK-MARK TIME DEPENDENT OFFSET DEFINITIONS
;

.=C.TIM+4            ;START OF DEPENDENT AREA
C.AST:'L' .BLKW 1     ;AST ADDRESS
C.SRC:'L' .BLKW 1     ;FLAG MASK WORD FOR 'BIS' SOURCE
C.DST:'L' .BLKW 1     ;ADDRESS OF 'BIS' DESTINATION

;
; CLOCK QUEUE CONTROL BLOCK-PERIODIC RESCHEDULING DEPENDENT OFFSET
; DEFINITIONS
;

.=C.TIM+4            ;START OF DEPENDENT AREA
C.RSI:'L' .BLKW 2     ;RESCHEDULE INTERVAL IN CLOCK TICKS
C.UIC:'L' .BLKW 1     ;SCHEDULING UIC

```


CLKDF\$ (Cont.)

```

;
; CLOCK QUEUE CONTROL BLOCK-SINGLE SHOT DEPENDENT OFFSET DEFINITIONS
;
.=C.TIM+4                      ;START OF DEPENDENT AREA
    .BLKW 2                    ;TWO UNUSED WORDS
    .BLKW 1                    ;SCHEDULING UIC

;
; CLOCK QUEUE CONTROL BLOCK-SINGLE SHOT INTERNAL SUBROUTINE OFFSET
; DEFINITIONS
;
; THERE ARE TWO TYPE CODES FOR THIS TYPE OF REQUEST:'L'
;
;     TYPE 6=SINGLE SHOT INTERNAL SUBROUTINE WITH A 16-BIT VALUE AS
;           AN IDENTIFIER.
;
;     TYPE 8=SINGLE SHOT INTERNAL SUBROUTINE WITH A TCB ADDRESS AS
;           AN IDENTIFIER.
;

.=C.TIM+4                      ;START OF DEPENDENT AREA
C.SUB:'L' .BLKW 1              ;SUBROUTINE ADDRESS
C.AR5:'L' .BLKW 1              ;RELOCATION BASE (FOR LOADABLE DRIVERS)
    .BLKW 1                    ;ONE UNUSED WORD
C.LGTH='B' .                    ;LENGTH OF CLOCK QUEUE CONTROL BLOCK
    .PSECT

    .MACRO                    CLKDF$ X,Y
    .ENDM
    .ENDM

```

DCBDFS

DCBDF

```

.MACRO      DCBDFS

;
; DEVICE CONTROL BLOCK
;
; THE DEVICE CONTROL BLOCK (DCB) DEFINES GENERIC
; INFORMATION ABOUT A DEVICE TYPE AND THE LOWEST AND
; HIGHEST UNIT NUMBERS. THERE IS AT LEAST ONE DCB FOR
; EACH DEVICE TYPE IN A SYSTEM. FOR EXAMPLE, IF THERE
; ARE TELETYPES IN A SYSTEM, THEN THERE IS AT LEAST ONE
; DCB WITH THE DEVICE NAME 'TT'. IF PART OF THE
; TELETYPES WERE INTERFACED VIA DL11-A'S AND THE REST
; VIA A DH11, THEN THERE WOULD BE TWO DCB'S. ONE FOR
; ALL DL11-A INTERFACED TELETYPES, AND ONE FOR ALL DH11
; INTERFACED TELETYPES.
;

.ASECT
.=0
000000 D.LNK: .BLKW 1 ;LINK TO NEXT DCB
000002 D.UCB: .BLKW 1 ;POINTER TO FIRST UNIT CONTROL BLOCK
000004 D.NAM: .BLKW 1 ;GENERIC DEVICE NAME
000006 D.UNIT: .BLKB 1 ;LOWEST UNIT NUMBER COVERED BY THIS DCB
000007 .BLKB 1 ;HIGHEST UNIT NUMBER COVERED BY THIS DCB
000010 D.UCBL: .BLKW 1 ;LENGTH OF UNIT CONTROL BLOCK IN BYTES
000012 D.DSP: .BLKW 1 ;POINTER TO DRIVER DISPATCH TABLE
000014 D.MSK: .BLKW 1 ;LEGAL FUNCTION MASK CODES 0-15.
000016 .BLKW 1 ;CONTROL FUNCTION MASK CODES 0-15.
000020 .BLKW 1 ;NOP'ED FUNCTION MASK CODES 0-15.
000022 .BLKW 1 ;ACP FUNCTION MASK CODES 0-15.
000024 .BLKW 1 ;LEGAL FUNCTION MASK CODES 16.-31.
000026 .BLKW 1 ;CONTROL FUNCTION MASK CODES 16.-31.
000030 .BLKW 1 ;NOP'ED FUNCTION MASK CODES 16.-31.
000032 .BLKW 1 ;ACP FUNCTION MASK CODES 16.-31.
000034 D.PCB: .BLKW 1 ;LOADABLE DRIVER PCB ADDRESS

.PSECT

;
; DRIVER DISPATCH TABLE OFFSET DEFINITIONS
;
D.VDEB=177776 ;DEALLOCATE INTERNAL BUFFERS (FD TTDRV)
D.VINI=0 ;DEVICE INITIATOR
D.VCAN=2 ;CANCEL CURRENT I/O FUNCTION
D.VOUT=4 ;DEVICE TIMEOUT
D.VPWF=6 ;POWERFAIL RECOVERY

```


EPKDF\$

```

.MACRO EPKDF$,L,B
;+
; Error Message Block Definitions
;-
.ASECT

```

```

;
; Header Subpacket
;
;

```

Subpacket Length in Bytes	
Subpacket Flags	
Format Identification	Operating System Code
Operating System Identification	
Flags	Context Code
Entry Sequence	
Error Sequence	
Entry Type Subcode	Entry Type Code
Time Stamp	
Reserved	Processor Type
Processor Identification (URM)	

```

.=0

```

E\$HLGH: 'L'	.BLKW 1	; Subpacket length in bytes
E\$HSBF: 'L'	.BLKW 1	; Subpacket Flags
E\$HSYS: 'L'	.BLKB 1	; Operating System Code
E\$HIDN: 'L'	.BLKB 1	; Format Identification
E\$HSID: 'L'	.BLKB 4	; Operating System Identification
E\$HCTX: 'L'	.BLKB 1	; Context Code
E\$HFLG: 'L'	.BLKB 1	; Flags
E\$HENS: 'L'	.BLKW 1	; Entry Sequence Number
E\$HERS: 'L'	.BLKW 1	; Error Sequence Number
E\$HENC: 'L'		; Entry Code
E\$HTYC: 'L'	.BLKB 1	; Entry Type Code
E\$HTYS: 'L'	.BLKB 1	; Entry Type Subcode
E\$HTIM: 'L'	.BLKB 6	; Time Stamp
E\$HPTY: 'L'	.BLKB 1	; Processor Type
	.BLKB 1	; Reserved
E\$HURM: 'L'	.BLKW 1	; Processor Identification (URM)
	.EVEN	
E\$HLEN: 'L'		; Length

EPKDF\$ (Cont.)

```

;
; Subpacket Flags for E$HSBF
;
    SM.ERR='B'      1      ; Error Packet
    SM.HDR='B'      1      ; Header Subpacket
    SM.TSK='B'      2      ; Task Subpacket
    SM.DID='B'      4      ; Device Identification Subpacket
    SM.DOP='B'     10      ; Device Operation Subpacket
    SM.DAC='B'     20      ; Device Activity Subpacket
    SM.DAT='B'     40      ; Data Subpacket
    SM.MBC='B'    20000    ; 22-bit massbus controller present
    SM.CMD='B'    40000    ; Error Log Command Packet
    SM.ZER='B'   100000    ; Zero I/O Counts
;
; Codes for field E$HIDN
;
    EH$FOR='B' 1          ; Current packet format
;
;
; Flags for the error log flags byte ($ERFLA) in the exec.
;
    ES.INI='B' 1          ; Error log initialized
    ES.DAT='B' 2          ; Error log receiving data packets
    ES.LIM='B' 4          ; Error limiting enabled
    ES.LOG='B' 10         ; Error logging enabled
;
; Type and Subtype Codes for fields E$HTYC and E$HTYS
;
; Symbols with names E$Cxxx are type codes for field E$HTYC,
; symbols with names E$Sxxx are subtype codes for field E$HTYS.
;
    E$CCMD='B' 1          ; Error Log Control
    E$SSTA='B' 1          ; Error Log Status Change
    E$SSWI='B' 2          ; Switch Logging Files
    E$SAPP='B' 3          ; Append File
    E$SBAC='B' 4          ; Declare Backup File
    E$SSHO='B' 5          ; Show
    E$SCHL='B' 6          ; Change Limits
    E$CERR='B' 2          ; Device Errors
    E$SDVH='B' 1          ; Device Hard Error
    E$SDVS='B' 2          ; Device Soft Error
    E$STMO='B' 3          ; Device Interrupt Timeout (HARD)
    E$SUNS='B' 4          ; Device Unsolicited Interrupt
    E$STMS='B' 5          ; Device Interrupt Timeout (SOFT)
    E$CDVI='B' 3          ; Device Information
    E$SDVI='B' 1          ; Device Information Message

    E$CDCI='B' 4          ; Device Control Information
    E$SMOU='B' 1          ; Device Mount
    E$SDMO='B' 2          ; Device Dismount
    E$SRES='B' 3          ; Device Count Reset
    E$SRCT='B' 4          ; Block Replacement
    E$CMEM='B' 5          ; Memory Detected Errors
    E$SMEM='B' 1          ; Memory Error
    E$CSYS='B' 6          ; System Control Information
    E$SPWR='B' 1          ; Power Recovery

```


EPKDF\$ (Cont.)

```

E$CCTL='B' 7      ; Control Information
E$STIM='B' 1      ;      Time Change
E$SCRS='B' 2      ;      System Crash
E$SLOA='B' 3      ;      Device Driver Load
E$SUNL='B' 4      ;      Device Driver Unload
E$SHRC='B' 5      ;      Reconfiguration Status Change
E$SMES='B' 6      ;      Message

E$CCPU='B' 10     ; CPU Detected Errors
E$SINT='B' 1      ;      Unexpected Interrupt

E$CSDE='B' 11     ; Software Detected Events
E$SABO='B' 1      ;      Task Abort

;
; Codes for Context Code entry E$HCTX
;
E$NOR='B' 1      ; Normal Entry
E$STA='B' 2      ; Start Entry
E$CRS='B' 3      ; Crash Entry

;
; Codes for Flags entry E$HFLG
;
E$VIR='B' 1      ; Addresses are virtual
E$EXT='B' 2      ; Addresses are extended
E$COU='B' 4      ; Error counts supplied
E$QBS='B' 10     ; Q-BUS CPU
E$LMR='B' 20     ; Limit reached

;
; Task Subpacket
;
;      +-----+
;      | Task Subpacket Length |
;      +-----+
;      | Task Name in RAD50    |
;      +-----+
;      | Task UIC              |
;      +-----+
;      | Task TI: Device Name  |
;      +-----+
;      | Flags                  | Task TI: Unit Number |
;      +-----+
;
.=0

E$TLGH:'L' .BLKW 1      ; Task Subpacket Length
E$TTSK:'L' .BLKW 2      ; Task Name in RAD50
E$TUIC:'L' .BLKW 1      ; Task UIC
E$TTID:'L' .BLKB 2      ; Task TI: Device Name
E$TTIU:'L' .BLKB 1      ; Task TI: Unit
E$TFLG:'L' .BLKB 1      ; Flags

.EVEN
E$TLEN:'L'

;
; Flags for entry E$TFLG
;
E$PRV='B' 1      ; Task is Privileged
E$PRI='B' 2      ; Terminal is Privileged

```

EPKDFS\$ (Cont.)

; Device Identification Subpacket	
;	
+-----+-----+	
Device Identification Subpacket Length	
+-----+-----+	
Device Mnemonic Name	
+-----+-----+	
Controller Number	Device Unit Number
+-----+-----+	
Physical Subunit #	Physical Unit #
+-----+-----+	
Physical Device Mnemonic (RSX-11M-PLUS only)	
+-----+-----+	
Reserved	Flags
+-----+-----+	
Volume Name of Mounted Volume	
+-----+-----+	
Pack Identification	
+-----+-----+	
Device Type Class	
+-----+-----+	
Device Type	
+-----+-----+	
I/O Operation Count Longword	
+-----+-----+	
Hard Error Count	Soft Error Count
+-----+-----+	
Blocks Transferred Count (RSX-11M-PLUS only)	
+-----+-----+	
Cylinders Crossed Count (RSX-11M-PLUS only)	
+-----+-----+	

.=0

```

E$ILGH:'L' .BLKW 1      ; Device Identification Subpacket Length
E$ILDV:'L' .BLKW 1      ; Device Mnemonic Name
E$ILUN:'L' .BLKB 1      ; Device Unit Number
E$IPCO:'L' .BLKB 1      ; Controller Number
E$IPUN:'L' .BLKB 1      ; Physical Unit Number
E$IPSU:'L' .BLKB 1      ; Physical Subunit Number

```

.IF DF R\$\$MPL

```

E$IPDV:'L' .BLKW 1      ; Physical Device Mnemonic

```

.ENDC ; R\$\$MPL

EPKDF\$ (Cont.)

```

E$IFLG:'L' .BLKB 1 ; Flags
               .BLKB 1 ; Reserved
E$IVOL:'L' .BLKB 12. ; Volume Name
E$IPAK:'L' .BLKB 4 ; Pack Identification
E$IDEV:'L' ; Device Type
E$IDCL:'L' .BLKW 1 ; Device Type Class
E$IDTY:'L' .BLKW 2 ; Device Type
E$IOPR:'L' .BLKW 2 ; I/O Operation Count Longword
E$IERS:'L' .BLKB 1 ; Soft Error Count
E$IERH:'L' .BLKB 1 ; Hard Error Count

      .IF DF R$$MPL

E$IBLK:'L' .BLKW 2 ; Blocks transferred count
E$ICYL:'L' .BLKW 2 ; Cylinders crossed count

      .ENDC ; R$$MPL

      .EVEN

E$ILEN:'L' ; Subpacket Length
;
; Flags for field E$IFLG
;
      EI$SUB='B' 1 ; Subcontroller device

      .IF DF R$$MPL

      EI$NUX='B' 2 ; No UCB extension, data invalid

      .ENDC ; R$$MPL

;
; Device Operation Subpacket
;
;
; +-----+-----+
; | Device Operation Subpacket Length |
; +-----+-----+
; | Task Name in RAD50 |
; +-----+-----+
; | Task UIC |
; +-----+-----+
; | Task TI: Logical Device Mnemonic |
; +-----+-----+
; | Reserved | Task TI: Device Unit |
; +-----+-----+
; | I/O Function Code |
; +-----+-----+
; | Reserved | Operation Flags |
; +-----+-----+
; | Transfer Operation Address |
; +-----+-----+
; | Transfer Operation Byte Count |
; +-----+-----+
; | Current Operation Retry Count |
; +-----+-----+
;
;
; =0

```

EPKDF\$ (Cont.)

```

E$OLGN:'L' .BLKW 1      ; Subpacket Length
E$OTSK:'L' .BLKW 2      ; Task Name in RAD50
E$OUIC:'L' .BLKW 1      ; Task UIC
E$OTID:'L' .BLKB 2      ; Task TI: Logical Device Mnemonic
E$OTIU:'L' .BLKB 1      ; Task TI: Logical Device Unit
                  .BLKB 1      ; Reserved
E$OFNC:'L' .BLKW 1      ; I/O Function Code
E$OFLG:'L' .BLKB 1      ; Operation Flags
                  .BLKB 1      ; Reserved
E$OADD:'L' .BLKW 2      ; Transfer Operation Address
E$OSIZ:'L' .BLKW 1      ; Transfer Operation Byte Count
E$ORTY:'L' .BLKW 1      ; Current Operation Retry Count
                  .EVEN

E$OLEN:'L'          ; Device Operation Subpacket Length
;
; Flags for field E$OFLG
;
      EO$TRA='B' 1      ; Transfer Operation
      EO$DMA='B' 2      ; DMA Device
      EO$EXT='B' 4      ; Extended Addressing Device
      EO$PIP='B' 10     ; Device is positioning

;
; I/O Activity Subpacket
;
;      +-----+
;      | I/O Activity Subpacket Length |
;      +-----+
;

.=0

E$ALGH:'L' .BLKW 1      ; Subpacket Length

;
; I/O Activity Subpacket Entry
;
;      +-----+
;      | Logical Device Name Mnemonic |
;      +-----+
;      | Controller Number | Logical Device Unit |
;      +-----+
;      | Physical Subunit # | Physical Unit Number |
;      +-----+
;      | Physical Device Mnemonic (RSX-11M-PLUS only) |
;      +-----+
;      | Task TI: logical unit | Device flags |
;      +-----+
;      | Requesting Task Name in RAD50 |
;      +-----+
;      | Requesting Task UIC |
;      +-----+
;      | Task TI: Logical Device Name |
;      +-----+
;      | I/O Function Code |
;      +-----+

```

(Continued on next page)

EPKDF\$ (Cont.)

```

;
; +-----+-----+
; | Reserved                | Flags          |
; +-----+-----+
; | Transfer Operation Address
; |
; +-----+-----+
; | Transfer Operation Byte Count
; |
;

```

```

.=0

```

```

E$ALDV:'L' .BLKW 1      ; Logical Device Name Mnemonic
E$ALUN:'L' .BLKB 1      ; Logical Device Unit
E$APCO:'L' .BLKB 1      ; Controller Number
E$APUN:'L' .BLKB 1      ; Physical Unit Number
E$APSU:'L' .BLKB 1      ; Physical Subunit Number

```

```

      .IF DF R$$MPL

```

```

E$APDV:'L' .BLKW 1      ; Physical Device Mnemonic

```

```

      .ENDC

```

```

E$ADFG:'L' .BLKB 1      ; Device flags
E$ATIU:'L' .BLKB 1      ; Task TI: Logical Unit
E$ATSK:'L' .BLKW 2      ; Requesting Task Name in RAD50
E$AUIC:'L' .BLKW 1      ; Requesting Task UIC
E$ATID:'L' .BLKW 1      ; Task TI: Logical Device Name
E$AFNC:'L' .BLKW 1      ; I/O Function Code
E$AFLG:'L' .BLKB 1      ; Flags
                .BLKB 1      ; Reserved
E$AADD:'L' .BLKW 2      ; Transfer Operation Address
E$ASIZ:'L' .BLKW 1      ; Transfer Operation Byte Count

```

```

      .EVEN

```

```

E$ALEN:'L'                ; Subpacket Entry Length

```

```

;

```

```

; Flags for field E$ADFG

```

```

;

```

```

      E$SUB='B' 1      ; Subcontroller device

```

```

      .IF DF R$$MPL

```

```

      E$NEX='B' 2      ; No UCB extension, data invalid

```

```

      .ENDC ; R$$MPL

```

```

;

```

```

; Flags for field E$AFLG

```

```

;

```

```

      E$TRA='B' 1      ; Transfer Operation
      E$DMA='B' 2      ; DMA Device
      E$EXT='B' 4      ; Device has Extended Addressing
      E$PIP='B' 10     ; Device is positioning

```

```

      .PSECT

```

```

      .MACRO EPKDF$ X,Y

```

```

      .ENDM

```

```

      .ENDM

```

EVNDF\$

```

.MACRO EVNDF$,L,B,LST

;
; EVNDF$ -- Event Packet Definitions
;
;       This module contains a macro which defines the offsets and field
;       values for TSA Event Packets (TEP's).  These packets are used to
;       pass data and status information between system components that
;       provide Digital's Terminal Software Architecture support on RSX.
;

; Explicit Inputs:
;
;       L           ":" for global offset definitions
;       B           "=" for global bit/value definitions
;       LST         "LIST" for macro expansion listing
;
; Implicit Inputs:
;
;       NONE
;
; Outputs:
;
;       Symbols defined as described above.
;       Listing as described above.
;

; General packet header format
;
;       .ASECT           ; Define offsets absolutely
;       .=0
;
E.VLNK:'L'           .BLKW 1 ; Link word
E.VSIZ:'L'           .BLKB 1 ; Packet size
E.VTYP:'L'           .BLKB 1 ; Packet type
E.VUCB:'L'           .BLKW 1 ; Terminal UCB address
;
; E.VTYP Values
;
ET.LOW='B'0           ; Lowest valid type code
;
ET.QIO='B'0           ; QIO(distinguishes QIO packet from TEP)
ET.BND='B'2           ; Bind Request
ET.UNB='B'4           ; Unbind Request
ET.BCP='B'6           ; Bind Complete
ET.REJ='B'10          ; Bind Reject
ET.DIS='B'12          ; Disconnect Notification
ET.DCP='B'14          ; Disconnect Complete
ET.ICS='B'16          ; Input Count State Change
ET.OOB='B'20          ; Out-of-Band (OOB)
ET.ONO='B'22          ; Abnormal Termination Request
ET.PHO='B'24          ; Physical Terminal Disconnected
;
ET.HI='B'24           ; Highest valid type code

```


EVNDF\$ (Cont.)

```

;
;   The following definitions are for packet types that require
;   passing additional information in the packets. All other packet
;   types use the general packet format described above.
;
;
;   Bind Request packet (Terminal Management Mode --> Network)
;
      .=E.VUCB+2

E.VBCT:'L'          .BLKW 1 ; Count of nodes (One for now)
E.VBND:'L'          .BLKB 6 ; Node name
E.VBLN:'L'          ; Length of bind request

;
;   Input Count State Change, Out-Of-Band packets (TTDRV --> Network)
;   And Modem Hang-up packets (TSA... --> Network)
;
      .=E.VUCB+2

E.VAPR:'L'          .BLKW 1 ; Doubleword address of packet...
E.VADR:'L'          .BLKW 1 ; ...queueing routine
E.VFLG:'L'          .BLKW 1 ; Flag

;
;   Input Count State Change
;
      .=E.VFLG+2

E.VSLN:'L'          ; Length of Input state message

;
;   OOB
;
      .=E.VFLG+2

E.VOBM:'L'          .BLKW 6 ; Out-of-Band bitmasks
E.VHDR:'L'          .BLKW 2 ; Type-ahead buffer header
E.VTAB:'L'          .BLKB 10 ; Type-ahead buffer
E.VOLN:'L'          ; Length of OOB packet

;
;   Terminal Management Switch Characters
;
      .=E.VFLG+2

E.VSWC:'L'          .BLKW 1 ; Terminal management switch characters
E.VTLN:'L'          ; Length of Switch Character packet

;
;   Bit values in flag word (E.VFLG). For convenience some bits have
;   corresponding bits in the AST Control Block flag word (A.PRM+5).
;
EF.NCO='B'1         ; All non-control characters are out-of band
EF.NOI='B'2         ; All non-control OOB are include-OOB
EF.AST='B'10        ; Reserved bit synonymous with TF.AST
EF.LCK='B'40        ; Reserved bit synonymous with AF.LCK
EF.QUE='B'100       ; TEP is queued
EF.MDE='B'200       ; TEP is marked for delete

```

EVNDF\$ (Cont.)

```

;
; Unbind Request packet (TMM --> Network)
;
      .=E.VUCB+2

E.VULN:'L'                                ; Length of Unbind message

;
; Connect Reject notification packet (Network --> TMM)
;
      .=E.VUCB+2

E.VRR:'L' .BLKW                          1 ; Reason for Rejection
E.VRLN:'L'                                ; Length of Reject message

;
; Disconnect Notification packet (Network --> TMM)
;
      .=E.VUCB+2

E.VRD:'L' .BLKW                          1 ; Reason for Disconnect
E.VDLN:'L'                                ; Length of Disconnect message

;
; Disconnect Complete packet (TMM --> Network)
;
      .=E.VUCB+2

E.VDCL:'L'                                ; Length of Disconnect Complete message

      .PSECT

      .IF NB LST
      .NLIST                                ; Turn listing back off
      .IFF
      .MACRO                                EVNDF$ ; If not listing, redefine
      .ENDM                                ; macro to nothing
      .ENDC
      .ENDM                                EVNDF$

```


F11DF\$

```

.MACRO F11DF$,L,B

;
; VOLUME CONTROL BLOCK
;

.ASECT
.=0

V.TRCT:'L'.BLKW 1      ; TRANSACTION COUNT
V.TYPE:'L'.BLKB 1      ; VOLUME TYPE DESCRIPTOR
    VT.FOR='B' 0        ; Foreign volume structure
    VT.SL1='B' 1        ; Files-11 Structure level 1
    VT.SL2='B' 2        ; Files-11 Structure level 2
    VT.ANS='B' 10       ; ANSI labeled tape
    VT.UNL='B' 11       ; Unlabeled tape
V.VCHA:'L'.BLKB 1      ; Volume characteristics
    VC.SLK='B' 1        ; Clear volume valid on dismount
    VC.HLK='B' 2        ; Unload the volume on dismount
    VC.DEA='B' 4        ; Deallocate the volume on dismount
    VC.PUB='B' 10       ; Set (clear) US.PUB on dismount
    VC.DUP='B' 20       ; Duplicate volume name; don't delete
                        ; logicals
V.LABL:'L'.BLKB 14     ; Volume label (ASCII)
V.PKSR:'L'.BLKW 2      ; Pack serial number for error logging
V.SLEN:'L'             ; Length of short VCB
V.IFWI:'L'.BLKW 1      ; INDEX FILE WINDOW
V.FCB:'L'.BLKW 2       ; FILE CONTROL BLOCK LIST HEAD
V.IBLB:'L'.BLKB 1      ; INDEX BIT MAP 1ST LBN HIGH BYTE
V.IBSZ:'L'.BLKB 1      ; INDEX BIT MAP SIZE IN BLOCKS
    .BLKW 1            ; INDEX BITMAP 1ST LBN LOW BITS
V.FMAX:'L'.BLKW 1      ; MAX NO. OF FILES ON VOLUME
V.WISZ:'L'.BLKB 1      ; DEFAULT SIZE OF WINDOW IN RTRV PTRS
                        ; VALUE IS < 128.
V.SBCL:'L'.BLKB 1      ; STORAGE BIT MAP CLUSTER FACTOR
V.SBSZ:'L'.BLKW 1      ; STORAGE BIT MAP SIZE IN BLOCKS
V.SBLB:'L'.BLKB 1      ; STORAGE BIT MAP 1ST LBN HIGH BYTE
V.FIEX:'L'.BLKB 1      ; DEFAULT FILE EXTEND SIZE
    .BLKW 1            ; STORAGE BIT MAP 1ST LBN LOW BITS
V.VOWN:'L'.BLKW 1      ; VOLUME OWNER'S UIC
V.VPRO:'L'.BLKW 1      ; VOLUME PROTECTION
V.FPRO:'L'.BLKW 1      ; VOLUME DEFAULT FILE PROTECTION
V.FRBK:'L'.BLKB 1      ; NUMBER OF FREE BLOCKS ON VOLUME HIGH BYTE
V.LRUC:'L'.BLKB 1      ; COUNT OF AVAILABLE LRU SLOTS IN FCB LIST
    .BLKW 1            ; NUMBER OF FREE BLOCKS ON VOLUME LOW BITS
V.STS:'L'.BLKB 1      ; VOLUME STATUS BYTE, CONTAINING THE
                        ; FOLLOWING
    VS.IFW='B' 1        ; INDEX FILE IS WRITE ACCESSED
    VS.BMW='B' 2        ; STORAGE BITMAP FILE IS WRITE ACCESSED
V.FFNU:'L'.BLKB 1      ; FIRST FREE INDEX FILE BITMAP BLOCK
V.EXT:'L'.BLKW 1       ; POINTER TO VCB EXTENSION
V.HBLB:'L'.BLKW 2      ; LBN of home block
V.HBCS:'L'.BLKW 2      ; Home block checksums
V.LGTH:'L'             ; SIZE IN BYTES OF VCB

```

F11DF\$ (Cont.)

```

;
; MOUNT LIST ENTRY
;
; EACH ENTRY ALLOWS ACCESS TO A SPECIFIED USER FOR A NON-PUBLIC DEVICE
;
; TO ALLOW EXPANSION, ONLY THE ONLY TYPE CODE DEFINED IS "1" FOR
; DEVICE ACCESS BLOCKS
;

```

```

.ASECT

```

```

.=0

```

```

M.LNK:'L'.BLKW 1 ; LINK WORD
M.TYPE:'L'.BLKB 1 ; TYPE OF ENTRY
      MT.MLS='B' 1 ; Mounted volume user access list
M.ACC:'L'.BLKB 1 ; NUMBER OF ACCESSES
M.DEV:'L'.BLKW 1 ; DEVICE UCB
M.TI:'L'.BLKW 1 ; ACCESSOR TI: UCB
M.LEN:'L' ; LENGTH OF ENTRY

```

```

;
; FILE CONTROL BLOCK
;

```

```

.ASECT

```

```

.=0

```

```

F.LINK:'L'.BLKW 1 ; FCB CHAIN POINTER
F.FNUM:'L'.BLKW 1 ; FILE NUMBER
F.FSEQ:'L'.BLKW 1 ; FILE SEQUENCE NUMBER
      .BLKB 1 ; NOT USED
F.FSQN:'L'.BLKB 1 ; FILE SEGMENT NUMBER
F.FOWN:'L'.BLKW 1 ; FILE OWNER'S UIC
F.FPRO:'L'.BLKW 1 ; FILE PROTECTION CODE
F.UCHA:'L'.BLKB 1 ; USER CONTROLLED CHARACTERISTICS
F.SCHA:'L'.BLKB 1 ; SYSTEM CONTROLLED CHARACTERISTICS
F.HDLB:'L'.BLKW 2 ; FILE HEADER LOGICAL BLOCK NUMBER
      ; BEGINNING OF STATISTICS BLOCK
F.LBN:'L'.BLKW 2 ; LBN OF VIRTUAL BLOCK 1 IF CONTIGUOUS
      ; 0 IF NON CONTIGUOUS
F.SIZE:'L'.BLKW 2 ; SIZE OF FILE IN BLOCKS
F.NACS:'L'.BLKB 1 ; NO. OF ACCESSES
F.NLCK:'L'.BLKB 1 ; NO. OF LOCKS
S.STBK='B'.-F.LBN ; SIZE OF STATISTICS BLOCK

F.STAT:'L' ; FCB STATUS WORD
F.NWAC:'L'.BLKB 1 ; NUMBER OF WRITE ACCESSORS
      .BLKB 1 ; STATUS BITS FOR FCB CONSISTING OF
      FC.WAC='B' 100000 ; SET IF FILE ACCESSED FOR WRITE
      FC.DIR='B' 40000 ; SET IF FCB IS IN DIRECTORY LRU
      FC.CEF='B' 20000 ; SET IF DIRECTORY EOF NEEDS UPDATING
      FC.FCO='B' 10000 ; SET IF TRYING TO FORCE DIRECTORY CONTIG
F.DREF:'L'.BLKW 1 ; DIRECTORY EOF BLOCK NUMBER
F.DRNM:'L'.BLKW 1 ; 1ST WORD OF DIRECTORY NAME
F.FEXT:'L'.BLKW 1 ; POINTER TO EXTENSION FCB
F.FVBN:'L'.BLKW 2 ; STARTING VBN OF THIS FILE SEGMENT
F.LKL:'L'.BLKW 1 ; POINTER TO LOCKED BLOCK LIST FOR FILE
F.WIN:'L'.BLKW 1 ; WINDOW BLOCK LIST FOR THIS FILE
F.LGTH:'L' ; SIZE IN BYTES OF FCB

```


F11DF\$ (Cont.)

```

;
; WINDOW
;

.ASECT

.=0

W.ACT:'L'          ; NUMBER OF ACTIVE MAPPING POINTERS
                   ; WHEN NO SECONDARY POOL
W.BLKS:'L'         ; BLOCK SIZE OF SECONDARY POOL SEGMENT
                   ; WHEN SECONDARY POOL
W.CTL:'L'.BLKW  1   ; LOW BYTE = # OF MAP ENTRIES ACTIVE
                   ; HIGH BYTE CONSISTS OF CONTROL BITS
      WI.RDV='B' 400 ; READ VIRTUAL BLOCK ALLOWED IF SET
      WI.WRV='B' 1000 ; WRITE VIRTUAL BLOCK ALLOWED IF SET
      WI.EXT='B' 2000 ; EXTEND ALLOWED IF SET
      WI.LCK='B' 4000 ; SET IF LOCKED AGAINST SHARED ACCESS
      WI.DLK='B' 10000 ; SET IF DEACCESS LOCK ENABLED
      WI.PND='B' 20000 ; WINDOW TURN PENDING BIT
      WI.EXL='B' 40000 ; SET IF MANUAL UNLOCK DESIRED
      WI.WCK='B' 100000 ; Data check all writes to file
W.IOC:'L'.BLKB  1   ; COUNT OF I/O THROUGH THIS WINDOW
      .BLKB  1       ; Reserved
W.FCB:'L'.BLKW  1   ; FILE CONTROL BLOCK ADDRESS
W.TCB:'L'.BLKW  1   ; TCB address of accessor
W.UCB:'L'.BLKW  1   ; Original UCB address of device
W.LKL:'L'.BLKW  1   ; POINTER TO LIST OF USERS LOCKED BLOCKS
W.WIN:'L'.BLKW  1   ; WINDOW BLOCK LIST LINK WORD

      .IF          NB,SYSDEF ; IF SYSDEF SPECIFIED IN CALL

      .IF          NDF,P$$WND ; IF SECONDARY POOL WINDOWS NOT ALLOWED

;
; NON-SECONDARY POOL WINDOW BLOCK
; IF SECONDARY POOL WINDOWS ARE NOT ENABLED, THE WINDOW BLOCK
; CONTAINS THE CONTROL INFORMATION AND RETRIEVAL POINTERS.
;

W.VBN:'L' .BLKB  1   ; HIGH BYTE OF 1ST VBN MAPPED BY WINDOW
W.MAP:'L'          ; DEFINE LABEL WITH ODD ADDRESS TO CATCH BAD
                   ; REFS
W.WISZ:'L'.BLKB  1   ; SIZE IN RTRV PTRS OF WINDOW (7 BITS)
      .BLKW  1       ; LOW ORDER WORD OF 1ST VBN MAPPED
W.RTRV:'L'          ; OFFSET TO 1ST RETRIEVAL POINTER IN WINDOW

W.SLEN='B'-4        ; Dummy definition to prevent incorrect
                   ; reference
                   ; (-4 when rounded "up" is a VERY large block)

      .IFF          ; IF WINDOWS IN SECONDARY POOL

;
; SECONDARY POOL WINDOW CONTROL AND MAPPING BLOCK
; IF SECONDARY POOL WINDOW BLOCKS ARE ENABLED, LUTN2 POINTS
; TO A CONTROL BLOCK IN SYSTEM POOL WHICH CONTAINS THE
; FOLLOWING CONTROL FIELDS AND THE MAPPING INFORMATION
; FOR THE SECONDARY POOL WINDOW.
;

```

F11DF\$ (Cont.)

```

W.MAP:'L' .BLKW 1      ; ADDR TO THE MAPPING PTRS IN SECONDARY POOL
W.SLEN:'L'           ; Length of primary pool stub

```

```

;
; SECONDARY POOL WINDOW
;
; IF SECONDARY POOL WINDOW BLOCKS ARE ENABLED, THE RETRIEVAL
; POINTERS ARE MAINTAINED IN SECONDARY POOL IN THE FOLLOWING
; FORMAT.
;

```

```

.=0

```

```

        ASSUME          W.CTL,0

```

```

        .BLKB 1      ; NUMBER OF ACTIVE MAPPING POINTERS
W.USE:'L' .BLKB 1    ; STATUS OF BLOCK
W.VBN:'L' .BLKB 1    ; HIGH BYTE OF 1ST VBN MAPPED BY WINDOW
W.WISZ:'L' .BLKB 1   ; SIZE IN RTRV PTRS OF WINDOW (7 BITS)
        .BLKW 1      ; LOW ORDER WORD OF 1ST VBN MAPPED
W.RTRV:'L'           ; OFFSET TO 1ST RETRIEVAL POINTER IN WINDOW

```

```

        .ENDC          ; END SECONDARY POOL WINDOW CONDITIONAL

```

```

        .ENDC          ; END SYSDEF CONDITIONAL

```

```

;
; LOCKED BLOCK LIST NODE
;

```

```

        .ASECT

```

```

.=0

```

```

L.LNK:'L' .BLKW 1      ; LINK TO NEXT NODE IN LIST
L.WIL:'L' .BLKW 1      ; POINTER TO WINDOW FOR FIRST ENTRY
L.VB1:'L' .BLKB 1      ; HIGH ORDER VBN BYTE
L.CNT:'L' .BLKB 1      ; COUNT FOR ENTRY
        .BLKW 1        ; LOW ORDER VBN
L.LKSZ:'L'

```

```

;
; END OF DEFINITIONS
;

```

```

        .PSECT
        .MACRO F11DF$ X,Y,Z
        .ENDM F11DF$
        .ENDM F11DF$

```


HDRDF\$

.MACRO HDRDF\$,L,B

;+

; TASK HEADER OFFSET DEFINITIONS

;-

.ASECT

.=0

H.CSP:'L'.BLKW	1	;CURRENT STACK POINTER
H.HDLN:'L'.BLKW	1	;HEADER LENGTH IN BYTES
H.EFLM:'L'.BLKW	2	;EVENT FLAG MASK WORD AND ADDRESS
H.CUIC:'L'.BLKW	1	;CURRENT TASK UIC
H.DUIC:'L'.BLKW	1	;DEFAULT TASK UIC
H.IPS:'L'.BLKW	1	;INITIAL PROCESSOR STATUS WORD (PS)
H.IPC:'L'.BLKW	1	;INITIAL PROGRAM COUNTER (PC)
H.ISP:'L'.BLKW	1	;INITIAL STACK POINTER (SP)
H.ODVA:'L'.BLKW	1	;ODT SST VECTOR ADDRESS
H.ODVL:'L'.BLKW	1	;ODT SST VECTOR LENGTH
H.TKVA:'L'.BLKW	1	;TASK SST VECTOR ADDRESS
H.TKVL:'L'.BLKW	1	;TASK SST VECTOR LENGTH
H.PFVA:'L'.BLKW	1	;POWER FAIL AST CONTROL BLOCK ADDRESS
H.FPVA:'L'.BLKW	1	;FLOATING POINT AST CONTROL BLOCK ADDRESS
H.RCVA:'L'.BLKW	1	;RECIEVE AST CONTROL BLOCK ADDRESS
H.EFSV:'L'.BLKW	1	;EVENT FLAG ADDRESS SAVE ADDRESS
H.FPSA:'L'.BLKW	1	;POINTER TO FLOATING POINT/EAE SAVE AREA
H.WND:'L'.BLKW	1	;POINTER TO NUMBER OF WINDOW BLOCKS
H.DSW:'L'.BLKW	1	;TASK DIRECTIVE STATUS WORD
H.FCS:'L'.BLKW	1	;FCS IMPURE POINTER
H.FORT:'L'.BLKW	1	;FORTRAN IMPURE POINTER
H.OVLY:'L'.BLKW	1	;OVERLAY IMPURE POINTER
H.VEXT:'L'.BLKW	1	;WORK AREA EXTENSION VECTOR POINTER
H.SPRI:'L'.BLKB	1	;PRIORITY DIFFERENCE FOR SWAPPING
H.NML:'L'.BLKB	1	;NETWORK MAILBOX LUN
H.RRVA:'L'.BLKW	1	;RECEIVE BY REFERENCE AST CONTROL BLOCK ADDRESS
H.X25:'L'.BLKB	1	; FOR USE BY X.25 SOFTWARE
	1	; FIVE RESERVED BYTES
	.BLKW 2	;
H.GARD:'L'.BLKW	1	;POINTER TO HEADER GUARD WORD
H.NLUN:'L'.BLKW	1	;NUMBER OF LUN'S
H.LUN:'L'.BLKW	2	;START OF LOGICAL UNIT TABLE

;+

; LENGTH OF FLOATING POINT SAVE AREA

;-

H.FPSL='B'25.*2

;

;+

; WINDOW BLOCK OFFSETS

;-

.=0

W.BPCB:'L'.BLKW	1	;PARTITION CONTROL BLOCK ADDRESS
W.BLVR:'L'.BLKW	1	;LOW VIRTUAL ADDRESS LIMIT
W.BHVR:'L'.BLKW	1	;HIGH VIRTUAL ADDRESS LIMIT
W.BATT:'L'.BLKW	1	;ADDRESS OF ATTACHMENT DESCRIPTOR
W.BSIZ:'L'.BLKW	1	;SIZE OF WINDOW IN 32W BLOCKS

HDRDF\$ (Cont.)

W.BoFF: 'L'.BLKW	1	;PHYSICAL MEMORY OFFSET IN 32W BLOCKS
W.BFPD: 'L'.BLKB	1	;FIRST PDR ADDRESS
W.BNPD: 'L'.BLKB	1	;NUMBER OF PDR'S TO MAP
W.BLPD: 'L'.BLKW	1	;CONTENTS OF LAST PDR
W.BLGH: 'L'		;LENGTH OF WINDOW DESCRIPTOR

.PSECT
.MACRO HDRDF\$ X,Y
.ENDM
.ENDM

HWDDF\$

.MACRO HWDDF\$,L,B

```

;+
; HARDWARE REGISTER ADDRESSES AND STATUS CODES
;-

MPCSR='B'    177746      ;ADDRESS OF PDP-11/70 MEMORY
                    ;PARITY REGISTER
MPAR='B'     172100      ;ADDRESS OF FIRST MEMORY
                    ;PARITY REGISTER
PIRQ='B'     177772      ;PROGRAMMED INTERRUPT REQUEST
                    ;REGISTER
PR0='B'       0          ;PROCESSOR PRIORITY 0
PR1='B'      40          ;PROCESSOR PRIORITY 1
PR4='B'     200          ;PROCESSOR PRIORITY 4
PR5='B'     240          ;PROCESSOR PRIORITY 5
PR6='B'     300          ;PROCESSOR PRIORITY 6
PR7='B'     340          ;PROCESSOR PRIORITY 7
PS='B'     177776        ;PROCESSOR STATUS WORD
SWR='B'     177570        ;CONSOLE SWITCH AND DISPLAY
                    ;REGISTER
TPS='B'     177564        ;CONSOLE TERMINAL PRINTER STATUS
                    ;REGISTER

```

```

;+
; EXTENDED ARITHMETIC ELEMENT REGISTERS
;-

```

.IF DF E\$SEAE

```

AC='B'      177302      ;ACCUMULATOR
MQ='B'      177304      ;MULTIPLIER-QUOTIENT
SC='B'      177310      ;SHIFT COUNT

```

.ENDC

```

;+
; MEMORY MANAGEMENT HARDWARE REGISTERS AND STATUS CODES
;-

```

.IF DF M\$MGE

```

KDSAR0='B'   172360      ;KERNEL D PAR 0
KSDSR0='B'   172320      ;KERNEL D PDR 0
KISAR0='B'   172340      ;KERNEL I PAR 0
KINAR0='B'   KISAR0      ;KERNEL I PAR 0
KISAR5='B'   172352      ;KERNEL I PAR 5
KINAR5='B'   KISAR5      ;KERNEL I PAR 5
KISAR6='B'   172354      ;KERNEL I PAR 6
KINAR6='B'   KISAR6      ;KERNEL I PAR 6
KISAR7='B'   172356      ;KERNEL I PAR 7
KINAR7='B'   KISAR7      ;KERNEL I PAR 7
KISDR0='B'   172300      ;KERNEL I PDR 0
KISDR6='B'   172314      ;KERNEL I PDR 6

```

HWDDF\$ (Cont.)

```

KISDR7='B'      172316      ;KERNEL I PAR 7
SISDR0='B'      172200      ;SUPERVISOR I PDR 0
UDSAR0='B'      177660      ;USER D PAR 0
UDSDR0='B'      177620      ;USER D PDR 0
UISAR0='B'      177640      ;USER I PAR 0
UISAR4='B'      177650      ;USER I PAR 4
UISAR5='B'      177652      ;USER I PAR 5
UISAR6='B'      177654      ;USER I PAR 6
UISAR7='B'      177656      ;USER I PAR 7
UISDR0='B'      177600      ;USER I PDR 0
UISDR4='B'      177610      ;USER I PDR 4
UISDR5='B'      177612      ;USER I PDR 5
UISDR6='B'      177614      ;USER I PDR 6
UISDR7='B'      177616      ;USER I PDR 7
UBMPR='B'      170200      ;UNIBUS MAPPING REGISTER 0
CMODE='B'      140000      ;CURRENT MODE FIELD OF PS WORD

```

```

.IFTF          ;M$MGE

```

```

PMODE='B'      30000      ;PREVIOUS MODE FIELD OF PS WORD

```

```

.IFT          ;M$MGE

```

```

SR0='B'      177572      ;SEGMENT STATUS REGISTER 0
SR3='B'      172516      ;SEGMENT STATUS REGISTER 3

```

```

.ENDC

```

```

;+
; FEATURE SYMBOL DEFINITIONS
;-

```

```

FE.EXT='B'      1      ;22-BIT EXTENDED MEMORY SUPPORT
FE.MUP='B'      2      ;MULTI-USER PROTECTION SUPPORT
FE.EXV='B'      4      ;EXECUTIVE IS SUPPORTED TO 20K
FE.DRV='B'      10     ;LOADABLE DRIVER SUPPORT
FE.PLA='B'      20     ;PLAS SUPPORT
FE.CAL='B'      40     ;DYNAMIC CHECKPOINT SPACE ALLOCATION
FE.PKT='B'      100    ;PREALLOCATION OF I/O PACKETS
FE.EXP='B'      200    ;EXTEND TASK DIRECTIVE SUPPORTED
FE.LSI='B'      400    ;PROCESSOR IS AN LSI-11
FE.OFF='B'      1000   ;PARENT OFFSPRING TASKING SUPPORTED
FE.FDT='B'      2000   ;FULL DUPLEX TERMINAL DRIVER
FE.X25='B'      4000   ;X.25 COM EXECUTIVE LOADED (1=YES)
FE.DYM='B'      10000  ;DYNAMIC MEMORY ALLOCATION SUPPORTED
FE.CEX='B'      20000  ;COM EXEC IS LOADED
FE.MXT='B'      40000  ;MCR EXIT AFTER EACH COMMAND MODE
FE.NLG='B'      100000 ;LOGINS DISABLED - MULTI-USER SUPPORT

```

```

;+
; SECOND FEATURE MASK SYMBOL DEFINITIONS
;-

```

```

F2.DAS='B'      1      ;KERNEL DATA SPACE (M-PLUS ONLY)
F2.LIB='B'      2      ;SUPERVISOR MODE LIBRARIES
F2.MP='B'      4      ;MULTIPROCESSING SUPPORT

```


HWDDF\$ (Cont.)

```

F2.EVT='B'      10      ;EVENT TRACE SUPPORT
F2.ACN='B'      20      ;CPU ACCOUNTING
F2.SDW='B'      40      ;SHADOW RECORDING
F2.POL='B'     100      ;SECONDARY POOLS
F2.WND='B'     200      ;SECONDARY POOL FILE WINDOWS
F2.DPR='B'     400      ;DIRECTIVE PARTITION SUPPORT
F2.IRR='B'    1000      ;INSTALL, REQUEST AND REMOVE SUPPORT
F2.GGF='B'    2000      ;GROUP GLOBAL EVENT FLAG SUPPORT
F2.RAS='B'    4000      ;RECEIVE/SEND DATA PACKET SUPPORT
F2.AHR='B'   10000      ;ALT. HEADER REFRESH AREAS SUPPORTED
F2.RBN='B'   20000      ;ROUND ROBIN SCHEDULING SUPPORT
F2.SWP='B'   40000      ;EXECUTIVE LEVEL DISK SWAPPING SUPPORT
F2.STP='B'  100000      ;EVENT FLAG MASK IS IN THE TCB (1=YES)

```

```

;+
; THIRD FEATURE MASK SYMBOL DEFINITIONS
;-

```

```

F3.CRA='B'      1      ;SPONTANEOUS CRASH (1=YES)
F3.NWK='B'      2      ;SYSTEM HAS NETWORK SUPPORT
F3.EIS='B'      4      ;SYSTEM REQUIRES THE EXTENDED INST. SET
F3.STM='B'     10      ;SYSTEM HAS SET SYSTEM TIME DIRECTIVE
F3.UDS='B'     20      ;USER DATA SPACE (M-PLUS ONLY)
F3.PRO='B'     40      ;PROTO TCBS OUT OF POOL "
F3.XHR='B'    100      ;EXTERNAL HEADER SUPPORT "
F3.AST='B'    200      ;SYSTEM HAS AST SUPPORT
F3.IIS='B'    400      ;SYSTEM IS RSX-11S
F3.CLI='B'   1000      ;SYSTEM HAS MULTIPLE CLI SUPPORT
F3.TCM='B'   2000      ;TERMINAL COMMON (M-PLUS ONLY)
F3.PMN='B'   4000      ;POOL MONITORING SUPPORT
F3.WAT='B'  10000      ;WATCHDOG TIMER SUPPORT
F3.RLK='B'  20000      ;'RMS' RECORD LOCKING SUPPORT
F3.SHF='B'  40000      ;MEMORY SHUFFLER SUPPORTED
;F3.RES='B' 100000      ;RESERVED FOR FUTURE EXPANSION OF 11M

```

```

; HARDWARE FEATURE MASK SYMBOL DEFINITIONS
;-

```

```

HF.UBM='B'      1      ;SYSTEM HAS A UNIBUS MAP (1=YES)
HF.EIS='B'      2      ;SYSTEM HAS EXTENDED INSTRUCTION SET
HF.QB='B'       4      ;SYSTEM HAS A QBUS BACKPLANE (1=YES)
HF.CIS='B'     200      ;SYSTEM HAS COMMERCIAL INSTRUCTION SET
HF.FPP='B'  100000      ;SYSTEM SUPPORTS FLOATING POINT (1=NO)

```

```

.MACRO HWDDF$ X,Y
.ENDM
.ENDM

```

ITBDF\$

```

;
; .MACRO ITBDF$ L,B
;
;+
; INTERRUPT TRANSFER BLOCK (ITB) OFFSET DEFINITIONS
;-

    .IF DF A$$TRP

    .MCALL PKTDF$
    PKTDF$                ; DEFINE AST BLOCK OFFSETS

    .ENDC

    .ASECT
    .=0
X.LNK:'L' .BLKW 1          ; LINK WORD FOR ITB LIST STARTING IN TCB
X.JSR:'L' JSR R5,@#0      ; CALL $INTSC
X.PSW:'L' .BLKB 1         ; LOW BYTE OF PSW FOR ISR
    .BLKB 1               ; UNUSED
X.ISR:'L' .BLKW 1         ; ISR ENTRY POINT (APR5 MAPPING)
X.FORK:'L'                ; FORK BLOCK
    .BLKW 1               ; THREAD WORD
    .BLKW 1               ; FORK PC
    .BLKW 1               ; SAVED R5
    .BLKW 1               ; SAVED R4

    .IF DF M$$MGE

X.REL:'L' .BLKW 1          ; RELOCATION BASE FOR APR5

    .ENDC

X.DSI:'L' .BLKW 1          ; ADDRESS OF DIS.INT. ROUTINE
X.TCB:'L' .BLKW 1          ; TCB ADDRESS OF OWNING TASK

    .IF NB SYSDEF

    .IF DF A$$TRP

    .BLKW 1               ; A.DQSR FOR AST BLOCK
X.AST:'L' .BLKB A.PRM      ; AST BLOCK

    .ENDC

X.VEC:'L' .BLKW 1          ; VECTOR ADDRESS (IF AST SUPPORT,
                          ; THIS IS FIRST AND ONLY AST
                          ;PARAMETER)
X.VPC:'L' .BLKW 1          ; SAVED VECTOR PC
X.LEN:'L'                ; LENGTH IN BYTES OF ITB

    .ENDC

    .PSECT
    .MACRO ITBDF$ X,Y,Z
    .ENDM ITBDF$
    .ENDM ITBDF$

```


LCBDF\$

```

;

      .MACRO  LCBDF$,L,B

;+
; LOGICAL ASSIGNMENT CONTROL BLOCK
;
; THE LOGICAL ASSIGNMENT CONTROL BLOCK (LCB) IS USED TO ASSOCIATE A
; LOGICAL NAME WITH A PHYSICAL DEVICE UNIT.  LCB'S ARE LINKED TOGETHER
; TO FORM THE LOGICAL ASSIGNMENTS OF A SYSTEM.  ASSIGNMENTS MAY BE ON
; A SYSTEM WIDE OR LOCAL (TERMINAL) BASIS.
;-

      .ASECT

.=0
L.LNK:'L'  .BLKW 1           ;LINK TO NEXT LCB
L.NAM:'L'  .BLKW 1           ;LOGICAL NAME OF DEVICE
L.UNIT:'L' .BLKB 1           ;LOGICAL UNIT NUMBER
L.TYPE:'L' .BLKB 1           ;TYPE OF ENTRY (0=SYSTEM WIDE)
L.UCB:'L'  .BLKW 1           ;TI UCB ADDRESS
L.ASG:'L'  .BLKW 1           ;ASSIGNMENT UCB ADDRESS
L.LGTH='B' .-L.LNK           ;LENGTH OF LCB
      .PSECT

      .MACRO          LCBDF$,X,Y
      .ENDM
      .ENDM

```

MTADFS

```

        .MACRO      MTADFS,L,B
        .ASECT

;
; ANSI MAGTAPE SPECIFIC DATA STRUCTURES
;
; VOLUME SET CONTROL BLOCK OFFSET DEFININTIONS (VSCB)
;
; VOLUME SET AND PROCESS CONTROL SECTION
;
.=0
V.TCNT:'L' .BLKW 1      ;TRANSACTION COUNT
V.TYPE:'L' .BLKB 1      ;VOLUME TYPE DESCRIPTOR
V.VCHA:'L' .BLKB 1      ;VOLUME CHARACTERISTICS
V.LABL:'L' .BLKB 12.    ;FILE SET ID (FIRST SIX BYTES)
V.NXT:'L' .BLKW 1      ;PTR TO NEXT VSCB NODE
V.MVL:'L' .BLKW 1      ;PTR TO MOUNTED VOL LIST
V.UVL:'L' .BLKW 1      ;PTR TO UNMOUNTED VOL LIST
V.ATL:'L' .BLKW 1      ;ATL ADDR OF ACCESSING TASK
                        ; TCB IN RSX11M
V.UCB:'L' .BLKW 1      ;ADDR OF CURRENT UCB OR PUD
V.RVOL:'L' .BLKB 1      ;CURRENT RELATIVE VOL #
V.MOU:'L' .BLKB 1      ;MOUNT MODE BYTE
V.TCHR:'L' .BLKW 1      ;UINT CHAR. FOR ALL UNITS USED FOR VOL SET
V.SEQN:'L' .BLKW 1      ;CURRENT FILE SEQUENCE #
V.SECH:'L' .BLKW 1      ;CURRENT FILE SECTION #
V.TPOS:'L' .BLKB 1      ;POSITION OF TAPE IN TM'S TO NXT HDR1
V.PSTA:'L' .BLKB 1      ;PROCESS STATUS BYTE
V.TIMO:'L' .BLKW 1      ;BLOCKED PROCESS TIMEOUT COUNTER
V.STAT:'L' .BLKW 3      ; STATUS WORDS USED BY COMMAND
                        ;EXECUTION MODULES
V.TRTB:'L' .BLKB 1      ;TRANSLATION CONTROL BYTE
V.EFTV:'L' .BLKB 1      ;FOR MAG TO RETURN IE.EOF, EOT, EOV
;
; LABEL DATA SECTION
;
V.BKLG:'B' .BLKW 1      ;BLOCK LENGTH
V.RECL:'B' .BLKW 1      ;RECORD LENGTH
V.FNAM:'L' .BLKW 3      ;FILE NAME
V.FTYP:'L' .BLKW 1      ;FILE TYPE
V.FVER:'L' .BLKW 1      ;FILE VERSION #
V.CDAT:'L' .BLKW 2      ;CREATION DATE
V.EDAT:'L' .BLKW 2      ;EXPIRATION DATE
V.BKLC:'L' .BLKW 2      ;BLOCK COUNT FOR FILE SECTION
V.RTYP:'L' .BLKB 1      ;RECORD TYPE
V.FATT:'L' .BLKB 1      ;FILE ATTRIBUTES FOR CARRIAGE CONTROL
                        .BLKB 30. ;REMAINDER OF FILE ATTRIBUTES
;
; NULL WINDOW SECTION
;
V.WIND:'L' .BLKW 4.      ; NULL WINDOW
;*****

```


MTADF\$ (Cont.)

```

V.MST2:'L' .BLKW 1 ;MAGTAPE STATUS BITS
V.FABY:'L' .BLKB 1 ;FILE ACCESSIBILITY BYTE (HDR1)
               .BLKB 1 ;SPARE
V.ANSN:'L' .BLKB 17. ;ANSI 17 CHARACTER FILE NAME
V.BoFF:'L' .BLKB 1. ;BUFFER OFFSET
V.DENS:'L' .BLKB 1. ;REQUESTED UNIT DENSITY
V.DRAT:'L' .BLKB 1. ;DEFAULT RECORD ATTRIBUTES
V.DBLK:'L' .BLKW 1. ;DEFAULT BLOCK SIZE
V.DREC:'L' .BLKW 1. ;DEFAULT RECORD SIZE
               ;*****
S.VSCB=. ;SIZE OF VSCB
               .PSECT
;
; DEFINE OFFSETS INTO NULL WINDOW SECTION
;
               .ASECT
.=0
      W.CTL: .BLKW 1 ;CONTROL WORD IN WINDOW
      V.WINC=V.WIND+W.CTL ; CNTRL WORD IN NULL WINDOW
               .PSECT ; RELATIVE TO THE VSCB
;
; MOUNTED VOLUME LIST OFFSET DEFINITIONS (MVL)
;
               .ASECT
.=0
               .IF DF R$$11M
M.NXT:'L' .BLKW 1 ;PTR TO NXT MVL NODE (11M)
               .ENDC
M.UIC:'L' .BLKW 1 ;OWNER UIC FROM RVOL #1
M.CH:'L' .BLKW 1 ; U.CH/U.VP (11D)
M.PROT:'L' .BLKW 1 ;PROTECTION U.AR IN 11D
               .IF NDF R$$11M
               .BLKW 2 ; ACP WORDS 11D
M.NXT:'L' .BLKW 1 ;PTR TO NEXT MVL NODE (11D)
               .ENDC
M.RVOL:'L' .BLKB 1 ;RELATIVE VOL # OF MOUNTED VOLUME
M.STAT:'L' .BLKB 1 ;VOLUME STATUS
M.VIDP:'L' .BLKW 1 ;VOLUME ID POINTER
M.UCB:'L' .BLKW 1 ;ADDR OF ASSOC UCB OR PUD
S.MVL=. ;SIZE OF MVL NODE
               .PSECT
;
; UNMOUNTED VOLUME AND VOLUME LIST OFFSET DEFINITIONS (UVL)
;
               .ASECT
.=0
L.NXT:'L' .BLKW 1 ;PTR TO NXT UVL NODE
L.VOL1:'L' .BLKB 1 ;REL VOL # OF 1'ST VOL IN NODE
L.VOL2:'L' .BLKB 1 ;REL VOL # OF 2'ND VOL IN NODE
L.VID1:'L' .BLKB 6 ;VOL ID OF 1'ST VOL IN NODE
L.VID2:'L' .BLKB 6 ;VOL ID OF 2'ND VOL IN NODE
S.UVL=. ;SIZE OF UVL NODE
               .PSECT
;
;
; SYSTEM DATA STRUCTURE CONTENT VALUES
;
; VSCB VALUES

```

MTADF\$ (Cont.)

```

; V.MOU VALUES
VM.OLD='B' 200 ;OLD .FL300 VOLUME -- VM.BYP WILL ALSO
; BE SET
VM.BYP='B' 100 ;BYPASS LABEL PROCESSING
VM.ULB='B' 40 ;UNLABELED TAPE
VM.FSC='B' 20 ;OVERRIDE FILE SET ID CHECK
VM.EXC='B' 10 ;OVERRIDE EXPIRATION DATE CHECK

; V.MST2 VALUES [B
V2.INI='B' 1 ;MAG WANTS US TO INITIALIZE NEXT OUTPUT
V2.XH2='B' 2 ;THIS FILE HAS NO HDR2, DON'T WRITE EOF2
V2.XH3='B' 4 ;THIS FILE HAS NO HDR3, DON'T WRITE EOF3
V2.NH3='B' 10 ;DON'T WRITE HDR3/EOX3 LABELS
V2.OAC='B' 20 ;OVERRIDE FILE/VOLUME ACCESSIBILITY

; V.PSTA VALUES - UNBLOCKED TRANSITION STATE
VP.RM='B' 2 ;READ DATA MODE
VP.WM='B' 4 ;WRITE DATA MODE
VP.UCM='B' 6 ;UNLABELLED CREATE POSITIONING MODE
VP.SM='B' 10 ;SEARCH MODE
VP.MOU='B' 20 ;MOUNT MODE
VP.RWD='B' 40 ;REWIND OR VOL VERIFICATION WAIT
VP.VFY='B' VP.RWD ;PROCESS IN POSITIONING MODE (MULTI-SECTION
VP.POS='B' 100 ;FILE)

;
; BLOCKED STATE = -(UNBLOCKED TRANSITION STATE VALUES)
;
;PROCESS TIMED OUT BIT 0 = 1
VP.TO=1

;
;
; NULL WINDOW CONTROL BIT DEFINITIONS
;
WI.RDV='B' 400 ;ACCESSED FOR READ
WI.WRV='B' 1000 ;ACCESSED FOR WRITE
WI.EXT='B' 2000 ;ACCESSED FOR EXTEND
WI.LCK='B' 4000 ;LOCKED
;

;
; MVL VALUES IN THE M.STAT FIELD
;
MS.VER='B' 200 ;VOL ID NOT VERIFIED
MS.RID='B' 1 ;VOL ID TO BE READ NOT CHECKED
MS.NMO='B' 2 ;MOUNT MESSAGE NOT GIVEN YET
MS.TMO='B' 4 ;ONE TIMEOUT ALREADY EXPRIED
MS.EXP='B' 10 ;EXPIRATION DATE MESSAGE GIVEN
;
;
; MISC BITS USED IN MOUNT (STORED IN V.STS)
;
MO.OVR='B' 1 ; OVER RIDE VOL NAME SWITCH
MO.UIC='B' 2 ; EXPLICIT UIC GIVEN
MO.PRO='B' 4 ; EXPLICIT PROTECTION GIVEN
MO.160='B' 10 ; 1600 BPI SPECIFIED
;

.ENDM

```


PCBDF\$

```

      .MACRO PCBDF$ L,B

;+
; PARTITION CONTROL BLOCK OFFSET DEFINITIONS
;-

      .ASECT
      .=0
P.LNK:'L' .BLKW 1      ;LINK TO NEXT PARTITION PCB
P.PRI:'L' .BLKB 1      ;PRIORITY OF PARTITION
P.IOC:'L' .BLKB 1      ;I/O + I/O STATUS BLOCK COUNT
P.NAM:'L' .BLKW 2      ;PARTITION NAME IN RAD50
P.SUB:'L' .BLKW 1      ;POINTER TO NEXT SUBPARTITION
P.MAIN:'L' .BLKW 1      ;POINTER TO MAIN PARTITION

      .IF NB SYSDEF

      .IF NDF M$$MGE

P.HDR:'L'              ;POINTER TO HEADER CONTROL BLOCK

      .ENDC

      .IFTF

P.REL:'L' .BLKW 1      ;STARTING PHYSICAL ADDRESS OF PARTITION
P.BLKS:'L'
P.SIZE:'L' .BLKW 1      ;SIZE OF PARTITION IN:
                        ; UNMAPPED SYSTEMS - BYTES
                        ; MAPPED SYSTEMS - 32 WORD BLOCKS
P.WAIT:'L' .BLKW 1      ;PARTITION WAIT QUEUE LISTHEAD (2 WORDS)
P.SWSZ:'L' .BLKW 1      ;PARTITION SWAP SIZE (SYSTEM ONLY)
P.BUSY:'L' .BLKB 2      ;PARTITION BUSY FLAGS
P.OWN:'L'
P.TCB:'L' .BLKW 1      ;TCB ADDRESS OF OWNER TASK
P.STAT:'L' .BLKW 1      ;PARTITION STATUS FLAGS

      .IFT

      .IF DF M$$MGE

P.HDR:'L' .BLKW 1      ;POINTER TO HEADER CONTROL BLOCK

      .ENDC

P.PRO:'L' .BLKW 1      ;PROTECTION WORD [DEWR,DEWR,DEWR,DEWR]
P.ATT:'L' .BLKW 2      ;ATTACHMENT DESCRIPTOR LISTHEAD

      .IF NDF P$$LAS

P.LGTH='B'P.PRO        ;LENGTH OF PARTITION CONTROL BLOCK

      .IFF

```

PCBDF\$ (Cont.)

```

P.LGTH='B'.                                ;LENGTH OF PARTITION CONTROL BLOCK

        .ENDC
        .IFF

        .PSECT

;+
; PARTITION STATUS WORD BIT DEFINITIONS
;-

PS.OUT='B' 100000                ;PARTITION IS OUT OF MEMORY(1=YES)
PS.CKP='B' 40000                 ;PARTITION CHECKPOINT IN PROGRESS (1=YES)
PS.CKR='B' 20000                 ;PARTITION CHECKPOINT IS REQUESTED (1=YES)
PS.CHK='B' 10000                 ;PARTITION IS NOT CHECKPOINTABLE (1=YES)
PS.FXD='B' 4000                  ;PARTITION IS FIXED (1=YES)
PS.PER='B' 2000                  ;PARITY ERROR IN PARTITION (1=YES)
PS.LIO='B' 1000                  ;MARKED BY SHUFFLER FOR LONG I/O (1=YES)
PS.NSF='B' 400                   ;PARTITION IS NOT SHUFFLEABLE (1=YES)
PS.COM='B' 200                   ;LIBRARY OR COMMON BLOCK (1=YES)
PS.PIC='B' 100                   ;POSITION INDEPENDENT LIBRARY OR COMMON
                                ; (1=YES)
PS.SYS='B' 40                    ;SYSTEM CONTROLLED PARTITION (1=YES)
PS.DRV='B' 20                    ;DRIVER IS LOADED IN PARTITION (1=YES)
PS.DEL='B' 10                    ;PARTITION SHOULD BE DELETED WHEN NOT
                                ; ATTACHED (1=YES)
PS.APR='B' 7                     ;STARTING APR NUMBER MASK

;+
; ATTACHMENT DESCRIPTOR OFFSETS
;-

        .ASECT

.=0
A.PCBL:'L' .BLKW 1                ;PCB ATTACHMENT QUEUE THREAD WORD
A.PRI:'L' .BLKB 1                 ;PRIORITY OF ATTACHED TASK
A.IOC:'L' .BLKB 1                 ;I/O COUNT THROUGH THIS DESCRIPTOR
A.TCB:'L' .BLKW 1                 ;TCB ADDRESS OF ATTACHED TASK
A.TCBL:'L' .BLKW 1                 ;TCB ATTACHMENT QUEUE THREAD WORD
A.STAT:'L' .BLKB 1                 ;STATUS BYTE
A.MPCT:'L' .BLKB 1                 ;MAPPING COUNT OF TASK THRU THIS DESCRIPTOR
A.PCB:'L' .BLKW 1                 ;PCB ADDRESS OF ATTACHED TASK
A.LGTH='B' .                      ;LENGTH OF ATTACHMENT DESCRIPTOR

;+
; ATTACHMENT DESCRIPTOR STATUS BYTE BIT DEFINITIONS
;-

        .PSECT

AS.DEL='B' 10                     ;TASK HAS DELETE ACCESS (1=YES)
AS.EXT='B' 4                      ;TASK HAS EXTEND ACCESS (1=YES)
AS.WRT='B' 2                      ;TASK HAS WRITE ACCESS (1=YES)
AS.REDE='B' 1                     ;TASK HAS READ ACCESS (1=YES)

        .ENDC

        .MACRO PCBDF$ X,Y,Z
        .ENDM
        .ENDM

```


PKTDF\$

.MACRO PKTDF\$,L,B

```
;+
; ASYNCHRONOUS SYSTEM TRAP CONTROL BLOCK OFFSET DEFINITIONS
;
; SOME POSITIONAL DEPENDENCIES BETWEEN THE OCB AND THE AST CONTROL
; BLOCK ARE RELIED UPON IN THE ROUTINE $FINXT IN THE MODULE SYSXT.
;-
```

.ASECT

.=177774

```
A.KSR5:'L' .BLKW 1 ;SUBROUTINE KISAR5 BIAS (A.CBL=0)
A.DQSR:'L' .BLKW 1 ;DEQUEUE SUBROUTINE ADDRESS (A.CBL=0)
               .BLKW 1 ;AST QUEUE THREAD WORD
A.CBL:'L' .BLKW 1 ;LENGTH OF CONTROL BLOCK IN BYTES
               ;IF A.CBL = 0, THE AST CONTROL BLOCK IS
               ;TO BE DEALLOCATED BY THE DEQUEUE SUBROUTINE
               ;POINTED TO BY A.DQSR MAPPED VIA APR 5
               ;VALUE A.KSR5. THIS IS CURRENTLY USED ONLY
               ;BY THE FULL DUPLEX TERMINAL DRIVER FOR
               ;UNSOLICITED CHARACTER ASTS.
               ;IF THE LOW BYTE OF A.CBL = 0, AND THE
               ;HIGH BYTE IS NOT = 0, THE AST CONTROL BLOCK
               ;IS A SPECIFIABLE AST, WITH LENGTH, C.LGTH.
               ;IF THE HIGH BYTE OF A.CBL = 0 AND THE LOW
               ;BYTE > 0, THEN THE LOW BYTE IS THE LENGTH
               ;OF THE AST CONTROL BLOCK. IF THE HIGH BYTE
               ;OF A.CBL = 0 AND THE LOW BYTE IS NEGATIVE,
               ;THIS IS A KERNEL AST. SEE BELOW FOR
               ;A DESCRIPTION OF A.CBL FOR KERNEL ASTS.
A.BYT:'L' .BLKW 1 ;NUMBER OF BYTES TO ALLOCATE ON TASK STACK
A.AST:'L' .BLKW 1 ;AST TRAP ADDRESS
A.NPR:'L' .BLKW 1 ;NUMBER OF AST PARAMETERS
A.PRM:'L' .BLKW 1 ;FIRST AST PARAMETER
;
; THE SPECIFIABLE AST CODES MUST NOT BE 0.
;
AS.FPA='B' 1 ;CODE FOR FLOATING POINT AST
AS.RCA='B' 2 ;CODE FOR RECEIVE DATA AST
AS.RRA='B' 3 ;CODE FOR RECEIVE BY REFERENCE AST
AS.PFA='B' 4 ;CODE FOR POWERFAIL AST
AS.REA='B' 5 ;CODE FOR REQUESTED EXIT (ABORT) AST
AS.CAA='B' 6 ;CODE FOR COMMAND ARRIVAL AST FOR CLIS
;
; BIT VALUES IN A.PRM+5
;
AF.XCC='B' 1 ;ATTACHED FOR ALL BUT CONTROL-C (TF.XCC)
AF.NOT='B' 2 ;ATTACHED FOR ALL NOTIFICATION (TF.NOT)
AF.OOB='B' 4 ;ACB IS FOR OUT-OF-BAND AST
AF.AST='B' 10 ;ACB HANDLES UNSOL. INPUT CHAR AST'S (TF.AST)
AF.ESQ='B' 20 ;ATTACHED FOR ESCAPE SEQUENCES (TF.ESQ)
AF.LCK='B' 40 ;ACB IS LOCKED
AF.QUE='B' 100 ;ACB IS QUEUED
AF.MDE='B' 200 ;ACB IS MARKED FOR DELETE
;
;
;
```

PKTDF\$ (Cont.)

```

; ABORTER SUBCODES FOR ABORT AST (AS.REA) TO BE RETURNED ON USER'S
; STACK
;
AB.NPV='B' 1 ;ABORTER IS NONPRIVILEGED (1=YES)
AB.TYP='B' 2 ;ABORT FROM DIRECTIVE (0=YES)
;ABORT FROM CLI COMMAND (1=YES)

```

```

;+
; KERNEL AST CONTROL BLOCK DEFINITIONS
;
; THE LOW BYTE OF A.CBL FOR A KERNEL AST HAS THE FOLLOWING FORMAT:
;
; BIT #200 ALWAYS EQUALS 1
; BIT #100 IS ZERO IF $SGFIN MUST BE CALLED DURING AST
; PROCESSING THE REMAINING SIX BITS ARE USED AS THE
; KERNEL AST TYPE FIELD
;
; BECAUSE THERE ARE ONLY 6 BITS AVAILABLE TO THE KERNEL AST
; INDEX FIELD, ONLY (2**6)-1 KERNEL AST TYPES ARE POSSIBLE.
;-

```

```

AK.BUF='B' 200 ;BUFFERED I/O COMPLETION AST
AK.OCB='B' 201 ;OFFSPRING EXIT
AK.GBI='B' 202 ;GENERAL BUFFERED I/O AST
AK.GGF='B' 303 ;GROUP GLOBAL RUNDOWN AST

```

```

;+
; OFFSPRING CONTROL BLOCK DEFINITIONS
;
; SOME POSITIONAL DEPENDENCIES EXIST BETWEEN THE OCB AND THE AST
; CONTROL BLOCK IN ROUTINE $FINXT IN MODULE SYSXT
;-

```

```

.=0
O.LNK:'L' .BLKW 1 ;OCB LINK WORD
O.MCRL:'L' .BLKW 1 ;ADDRESS OF MCR COMMAND LINE
O.PTCB:'L' .BLKW 1 ;PARENT TCB ADDRESS
O.AST:'L' .BLKW 1 ;EXIT AST ADDRESS
O.EFN:'L' .BLKW 1 ;EXIT EVENT FLAG
O.ESB:'L' .BLKW 1 ;EXIT STATUS BLOCK VIRTUAL ADDRESS
O.STAT:'L' .BLKW 8. ;EXIT STATUS BUFFER
O.LGTH='B' . ;LENGTH OF OCB

```

```

;+
; I/O PACKET OFFSET DEFINITIONS
;-

```

```

.ASECT
.=0
I.LNK:'L' .BLKW 1 ;I/O QUEUE THREAD WORD
I.PRI:'L' .BLKB 1 ;REQUEST PRIORITY
I.EFN:'L' .BLKB 1 ;EVENT FLAG NUMBER
I.TCB:'L' .BLKW 1 ;TCB ADDRESS OF REQUESTOR
I.LN2:'L' .BLKW 1 ;POINTER TO SECOND LUN WORD
I.UCB:'L' .BLKW 1 ;POINTER TO UNIT CONTROL BLOCK
I.FCN:'L' .BLKW 1 ;I/O FUNCTION CODE

```


PKTDF\$ (Cont.)

```

I.IOSB:'L' .BLKW 1 ;VIRTUAL ADDRESS OF I/O STATUS BLOCK
               .BLKW 1 ;I/O STATUS BLOCK RELOCATON BIAS
               .BLKW 1 ;I/O STATUS BLOCK ADDRESS
I.AST:'L' .BLKW 1 ;AST SERVICE ROUTINE ADDRESS
I.PRM:'L' .BLKW 1 ;RESERVED FOR MAPPING PARAMETER #1
               .BLKW 6 ;PARAMETERS 1 TO 6
               .BLKW 1 ;USER MODE DIAGNOSTIC PARAMETER WORD
;
; FOLLOWING ARE DEFINITIONS FOR FLAG BITS IN I.PRM+11
; (DSA DRIVERS INTERNAL USE ONLY)
;

IP.FAK='B' 20 ;IOP IS PSEUDO IOP
IP.ABO='B' 40 ;(MUDRV)ABORT COMMAND MUST BE ISSUED FOR IOP
IP.PND='B' 100 ;(MUDRV)ABORT COMMAND WAS ISSUED FOR IOP
IP.UMR='B' 200 ;A UMR WAIT BLOCK IS IN USE FOR THIS I/O

I.ATTL='B'. ;MINIMUM LENGTH OF I/O PACKET (USED BY
               ;FILE SYSTEM TO CALCULATE MAXIMUM
               ;NUMBER OF ATTRIBUTES)
I.LGTH='B'. ;LENGTH OF I/O REQUEST CONTROL BLOCK
;
; DEFINE OFFSETS IN I/O PACKET EXTENSION (IOPX)
;
               .ASECT
.=0

I.XLNK:'L' .BLKW 1 ;LINK WORD
I.XIOP:'L' .BLKW 1 ;I/O PACKET ADDRESS
I.XTCB:'L' .BLKW 1 ;TCB ADDRESS OF REQUESTING TASK
I.XMOD:'L' .BLKW 2 ;MODIFIER WORDS (NOTE: 2ND WORD MUST BE
               ;SPECIFIED AND MUST BE ZERO.)
I.XRBF:'L' .BLKW 2 ;READ DATA BUFFER ADDRESS APR BIAS
               ;READ DATA BUFFER VIRTUAL ADDRESS
I.XRBL:'L' .BLKW 1 ;READ DATA BUFFER LENGTH
I.XTMO:'L' .BLKW 1 ;READ TIME-OUT INTERVAL
I.XPBF:'L' .BLKW 2 ;PROMPT BUFFER ADDRESS APR BIAS
               ;PROMPT BUFFER VIRTUAL ADDRESS
I.XPBL:'L' .BLKW 1 ;PROMPT BUFFER LENGTH
I.XPBV:'L' .BLKW 1 ;PROMPT BUFFER VERTICAL FORMS CONTROL
I.XTTB:'L' .BLKW 2 ;TERMINATOR TABLE ADDRESS APR BIAS
               ;TERMINATOR TABLE VIRTUAL ADDRESS
I.XTTL:'L' .BLKW 1 ;TERMINATOR TABLE LENGTH
I.XDBF:'L' .BLKW 2 ;DEFAULT INPUT BUFFER ADDRESS APR BIAS
               ;DEFAULT INPUT BUFFER VIRTUAL ADDRESS
I.XDBL:'L' .BLKW 1 ;DEFAULT INPUT BUFFER LENGTH
;+
; GROUP GLOBAL EVENT FLAG CONTROL BLOCK OFFSETS
;-
.=0
G.LNK:'L' .BLKW 1 ;LINK WORD
G.GRP:'L' .BLKB 1 ;GROUP NUMBER
G.STAT:'L' .BLKB 1 ;STATUS BYTE
G.CNT:'L' .BLKW 1 ;ACCESS COUNT
G.EFLG:'L' .BLKW 2 ;EVENT FLAGS
G.LGTH='B' . ;LENGTH OF GROUP GLOBAL CONTROL BLOCK

```

PKTDF\$ (Cont.)

; STATUS BYTE DEFINITIONS

GS.DEL='B'1 ;GROUP MARKED FOR DELETE

;+

; EXECUTIVE POOL MONITOR CONTROL FLAGS

;-

; \$POLST IS THE SYNCHRONIZATION WORD BETWEEN THE EXEC AND POOL MONITOR

PC.HIH='B' 1 ;HIGH POOL LIMIT CROSSED (1=YES)
 PC.LOW='B' 2 ;LOW POOL LIMIT CROSSED (1=YES)
 PC.ALF='B' 4 ;FAILED TO ALLOCATE LARGE BLOCK (1=YES)
 PC.XAF='B' 10 ;FAILED TO ALLOCATE SMALL BLOCK (1=YES)
 PC.XIT='B' 200 ;FORCE POOL MONITOR TASK TO EXIT
 PC.NRM='B' PC.HIH*400 ;POOL TASK INHIBIT BIT FOR HIGH POOL
 PC.ALM='B' PC.LOW*400 ;POOL TASK INHIBIT BIT FOR LOW POOL

; \$POLFL IS THE POOL USAGE CONTROL WORD

PF.INS='B' 40 ;REJECT NONPRIVILEGED INS/RUN/REM
 PF.LOG='B' 100 ;LOGINS ARE DISABLED
 PF.REQ='B' 200 ;STALL REQUEST OF NONPRIV. TASKS

PF.ALL='B' 177777 ;TAKE ALL POSSIBLE ACTIONS TO SAVE POOL

;+

; CLI PARSER BLOCK (CPB) DEFINITIONS

;-

.=0

C.PTCB:'L' .BLKW 1 ;ADDRESS OF CLI'S TCB
 C.PNAM:'L' .BLKW 2 ;CLI NAME
 C.PSTS:'L' .BLKW 1 ;STATUS MASK
 C.PDPL:'L' .BLKB 1 ;LENGTH OF DEFAULT PROMPT
 C.PCPL:'L' .BLKB 1 ;LENGTH OF CNTRL/C PROMPT
 C.PRMT:'L' ;START OF ASCII PROMPT STRINGS
 ;THE DEFAULT STRING IS CONCATENATED
 ;WITH THE ^C STRING

;

; STATUS BIT DEFINITIONS

;

CP.NUL='B' 1 ;PASS EMPTY COMMAND LINES TO CLI
 CP.MSG='B' 2 ;CLI DESIRES SYSTEM MESSAGES
 CP.LGO='B' 4 ;CLI WANTS COMMANDS FROM LOGGED OFF TTYS
 CP.DSB='B' 10 ;CLI IS DISABLED
 CP.PRIV='B' 20 ;USER MUST BE PRIV TO SET TTY TO THIS CLI
 CP.SGL='B' 40 ;DON'T HANDLE CONTINUATIONS (M-PLUS ONLY)
 CP.NIO='B' 100 ;MCR..., HEL, BYE DO NO I/O TO TTY
 ;HEL, BYE ALSO DO NOT SET CLI ETC.
 CP.RST='B' 200 ;ABILITY TO SET TO THIS CLI IS RESTRICTED
 ;TO THE CLI ITSELF
 CP.EXT='B' 400 ;PASS TASK EXIT PROMPT REQUESTS TO CLI

;

; IDENTIFIER CODES FOR SYSTEM TO CLI MESSAGES.

;

; CODES 0 - 127. ARE RESERVED FOR USE BY DIGITAL,

; CODES 128. - 255. ARE RESERVED FOR USE BY CUSTOMERS

PKTDF\$ (Cont.)

```

;
CM.INE='B' 1      ;CLI INITIALIZED ENABLED
CM.IND='B' 2      ;CLI INITIALIZED DISABLED
CM.CEN='B' 3      ;CLI ENABLED
CM.CDS='B' 4      ;CLI DISABLED
CM.ELM='B' 5      ;CLI BEING ELIMINATED
CM.EXT='B' 6      ;CLI MUST EXIT IMMEDIATELY
CM.LKT='B' 7      ;NEW TERMINAL LINKED TO CLI
CM.RMT='B' 8.     ;TERMINAL REMOVED FROM CLI
CM.MSG='B' 9.     ;GENERAL MESSAGE TO CLI

;+
; ANCILLARY CONTROL BLOCK (ACB) DEFINITIONS
;-

.=0
A.REL:'L' .BLKW 1  ;ACD RELOCATION BIAS
A.DIS:'L' .BLKW 1  ;ACD DISPATCH TABLE POINTER
A.MAS:'L' .BLKW 2  ;ACT FUNCTION MASK
A.NUM:'L' .BLKB 1  ;ACD IDENTIFICATION NUMBER
A.FLEN:'L' .BLKB 1 ;LENGTH IN BYTES OF FULL ACB
A.LIN:'L' .BLKW 1  ;ACD LINK WORD
A.ACC:'L' .BLKB 1  ;ACD ACCESS COUNT
A.STA:'L' .BLKB 1  ;ACD STATUS BYTE
A.PLEN='B' .       ;LENGTH IN BYTES OF PROTOTYPE ACB
;
.=A.LIN            ;FULL ACB OVERLAPS PROTOTYPE ACB
A.IMAP:'L' .BLKW 1 ;ACD INTERRUPT BUFFER RELOCATION BIAS
A.IBUF:'L' .BLKW 1 ;ACD INTERRUPT BUFFER ADDRESS
A.ILEN:'L' .BLKW 1 ;ACD INTERRUPT BUFFER LENGTH
A.SMAP:'L' .BLKW 1 ;ACD SYSTEM STATE BUFFER RELOCATION BIAS
A.SBUF:'L' .BLKW 1 ;ACD SYSTEM STATE BUFFER ADDRESS
A.SLEN:'L' .BLKW 1 ;ACD SYSTEM STATE BUFFER LENGTH
A.IOS:'L' .BLKW 2  ;ACD I/O STATUS
A.RES='B' .        ;START OF ACB RESERVED FOR USE BY THE ACD
;
; DEFINE THE FLAG VALUES IN THE OFFSET U.AFLG
;
UA.ACC='B' 1      ;ACCEPT THIS CHARACTER
UA.PRO='B' 2      ;PROCESS THIS CHARACTER
UA.ECH='B' 4      ;ECHO THIS CHARACTER
UA.TYP='B' 10     ;FORCE THIS CHARACTER INTO TYPEAHEAD
UA.SPE='B' 20     ;THIS CHARACTER HAS A SPECIAL ECHO
UA.PUT='B' 40     ;PUT THIS CHARACTER IN THE INPUT BUFFER
UA.CAL='B' 100    ;CALL THE ACD BACK AFTER THE TRANSFER
UA.COM='B' 200    ;COMPLETE THE INPUT REQUEST
;
UA.ALL='B' 400     ;ALLOW PROCESSING OF THIS I/O REQUEST
UA.TRN='B' 1000    ;TRANSLATE CHARACTERS FROM OUTPUT QIO
UA.TRA='B' 2000    ;TRANSFER CHARACTERS WHEN I/O COMPLETES
;
; DEFINE THE ACD ENTRY POINTS (OFFSETS INTO THE DISPATCH TABLE)
;
.=0
A.ACCE:'L' .BLKW 1 ;I/O REQUEST ACCEPTANCE ENTRY POINT
A.DEQU:'L' .BLKW 1 ;I/O REQUEST DEQUEUE ENTRY POINT
A.POWE:'L' .BLKW 1 ;POWER FAILURE ENTRY POINT
A.INPU:'L' .BLKW 1 ;INPUT COMPLETION ENTRY POINT

```

PKTDF\$ (Cont.)

```

A.OUTPUT: 'L' .BLKW 1      ;OUTPUT COMPLETION ENTRY POINT
A.CONN: 'L' .BLKW 1       ;CONNECTION ENTRY POINT
A.DISC: 'L' .BLKW 1       ;DISCONNECTION ENTRY POINT
A.RECE: 'L' .BLKW 1       ;INPUT CHARACTER RECEPTION ENTRY POINT
A.PROC: 'L' .BLKW 1       ;INPUT CHARACTER PROCESSING ENTRY POINT
A.TRAN: 'L' .BLKW 1       ;OUTPUT QIO CHARACTER TRANSLATION ENTRY POINT
A.CALL: 'L' .BLKW 1       ;CALL ACD BACK AFTER TRANSFER ENTRY POINT
;
; DEFINE THE STATUS BITS IN A.STA OF THE PROTOTYPE ACB
;
AS.DLT= 'B' 1             ;ACD IS MARKED FOR DELETE
AS.DIS= 'B' 2             ;ACD IS DISABLED
      .PSECT

      .MACRO PKTDF$ X,Y,Z
      .ENDM
      .ENDM

```


SCBDF\$

```
; THE STATUS CONTROL BLOCK (SCB) DEFINES THE STATUS OF A DEVICE
; CONTROLLER. THERE IS ONE SCB FOR EACH CONTROLLER IN A SYSTEM.
; THE SCB IS POINTED TO BY UNIT CONTROL BLOCKS. TO EXPAND ON THE
; TELETYPE EXAMPLE ABOVE, EACH TELETYPEWRITER TYPE INTERFACED VIA
; A DL11-A WOULD HAVE A SCB SINCE EACH DL11-A IS AN INDEPENDENT
; INTERFACE UNIT. THE TELETYPES INTERFACED VIA THE DH11 WOULD
; ALSO EACH HAVE AN SCB SINCE THE DH11 IS A SINGLE CONTROLLER BUT
; MULTIPLEXES MANY UNITS IN PARALLEL.
;-
```

```
      .ASECT
      . =177772
S.RCNT:'L' .BLKB 1      ;NUMBER OF REGISTERS TO COPY ON ERROR
S.ROFF:'L' .BLKB 1      ;OFFSET TO FIRST DEVICE REGISTER
S.BMSV:'L' .BLKW 1      ;SAVED I/O ACTIVE BITMAP AND POINTER TO EMB
S.BMSK:'L' .BLKW 1      ;DEVICE I/O ACTIVE BIT MASK
S.LHD:'L' .BLKW 2      ;CONTROLLER I/O QUEUE LISTHEAD
S.PRI:'L' .BLKB 1      ;DEVICE PRIORITY
S.VCT:'L' .BLKB 1      ;INTERRUPT VECTOR ADDRESS /4
S.CTM:'L' .BLKB 1      ;CURRENT TIMEOUT COUNT
S.ITM:'L' .BLKB 1      ;INITIAL TIMEOUT COUNT
S.CON:'L' .BLKB 1      ;CONTROLLER INDEX
S.STS:'L' .BLKB 1      ;CONTROLLER STATUS (0=IDLE,1=BUSY)
S.CSR:'L' .BLKW 1      ;ADDRESS OF CONTROL STATUS REGISTER
S.PKT:'L' .BLKW 1      ;ADDRESS OF CURRENT I/O PACKET
S.FRK:'L' .BLKW 1      ;FORK BLOCK LINK WORD
S.DMCS:'L' .BLKW 1      ;DM11-BB CSR FOR FDX TTDRV
      .BLKW 1      ;FORK-PC
      .BLKW 1      ;FORK-R5
      .BLKW 1      ;FORK-R4

      .IF NB SYSDEF

      .IF DF L$SDRV & M$SMGE

      .BLKW 1      ;FORK-DRIVER RELOCATION BASE

      .ENDC

S.PORT:'L'      ;FIRST THREE CHAR. OF PORT NAME (RAD50)
S.PBIA='B' S.PORT+2 ;BIAS OF PORT COMMON
S.QST='B' S.PORT+4 ;ADDRESS OF QST, CONTROLLER STATE TABLE
S.BSYU='B' S.PORT+6 ;ADDRESS OF UNIT CORRESPONDING TO OLDEST CMD
; ZERO IF THERE ARE NO OUTSTANDING CMDS.
S.CCB:'L'      ;MIXED MASSBUS CHANNEL CONTROL BLOCK
S.MPR:'L' .BLKW 6 ;11/70 EXTENDED MEMORY UNIBUS DEVICE C-BLOCK
      .BLKW 1 ;BUFFER WORD
S.UMHD:'L' .BLKW 2 ;LIST HEAD FOR UMR ASSIGNMENT BLOCK(S)
S.UMCT:'L' .BLKW 1 ;COUNT OF AVAILABLE UMR ASSIGNMENT BLOCK(S)

      .IFF

      .PSECT
```

SCBDF\$ (Cont.)

```

;+
; STATUS CONTROL BLOCK PRIORITY BYTE CONDITION CODE STATUS BIT
; DEFINITIONS
;-

SP.EIP='B' 1          ;ERROR IN PROGRESS (1=YES)
SP.ENB='B' 2          ;ERROR LOGGING ENABLED (0=YES)
SP.LOG='B' 4          ;ERROR LOGGING AVAILABLE (1=YES)
SPARE=10              ;SPARE BIT

;+
; MAPPING ASSIGNMENT BLOCK (FOR UNIBUS MAPPING REGISTER ASSIGNMENT)
;-

      .ASECT
.=0
M.LNK:'L' .BLKW 1      ;LINK WORD
M.UMRA:'L' .BLKW 1      ;ADDRESS OF FIRST ASSIGNED UMR
M.UMRN:'L' .BLKW 1      ;NUMBER OF UMR'S ASSIGNED * 4
M.UMVL:'L' .BLKW 1      ;LOW 16 BITS MAPPED BY 1ST ASSIGNED UMR
M.UMVH:'L' .BLKB 1      ;HIGH 2 BITS MAPPED IN BITS 4 AND 5
M.BFVH:'L' .BLKB 1      ;HIGH 6 BITS OF PHYSICAL BUFFER ADDRESS
M.BFVL:'L' .BLKW 1      ;LOW 16 BITS OF PHYSICAL BUFFER ADDRESS
M.LGTH='B' .          ;LENGTH OF MAPPING ASSIGNMENT BLOCK

      .ENDC

      .PSECT

      .MACRO SCBDF$,X,Y,Z
      .ENDM
      .ENDM

```


TCBDF\$

```

.MACRO TCBDF$,L,B

;+
; TASK CONTROL BLOCK OFFSET AND STATUS DEFINITIONS
;
; TASK CONTROL BLOCK
;-

;
; SEVERAL PIECES OF PRIVILEGED CODE EXIST THAT CREATE TCBS FROM
; OTHER TCBS. SINCE THESE PIECES OF CODE ARE GENERALLY OPTIMIZED
; FOR SPEED AND DO NOT USE THE SYMBOLIC OFFSETS PROVIDED BELOW,
; ANY CHANGE IN THE TCB MUST ALSO BE MADE TO EACH OF THESE PIECES
; OF CODE. THE KNOWN LIST OF SUCH PIECES OF CODE IS AS FOLLOWS:
;
; LIBRARY          MODULE          COMMENT
; -----          -
;
; RSX11M           DRSPW           TCB CREATED FOR RPOI$ DIRECTIVE
; MCR              MCROV,MCRDIS     MULTIUSER TASK DISPATCHING
;

.ASECT

.=0
T.LNK:'L' .BLKW 1 ;UTILITY LINK WORD
T.PRI:'L' .BLKB 1 ;TASK PRIORITY
T.IOC:'L' .BLKB 1 ;I/O PENDING COUNT
T.CPCB:'L' .BLKW 1 ;POINTER TO CHECKPOINT PCB
T.NAM:'L' .BLKW 2 ;TASK NAME IN RAD50
T.RCVL:'L' .BLKW 2 ;RECEIVE QUEUE LISTHEAD
T.ASTL:'L' .BLKW 2 ;AST QUEUE LISTHEAD
T.EFLG:'L' .BLKW 2 ;TASK LOCAL EVENT FLAGS 1-32
T.UCB:'L' .BLKW 1 ;UCB ADDRESS FOR PSEUDO DEVICE 'TI'
T.TCBL:'L' .BLKW 1 ;TASK LIST THREAD WORD
T.STAT:'L' .BLKW 1 ;FIRST STATUS WORD (BLOCKING BITS)
T.ST2:'L' .BLKW 1 ;SECOND STATUS WORD (STATE BITS)
T.ST3:'L' .BLKW 1 ;THIRD STATUS WORD (ATTRIBUTE BITS)
T.DPRI:'L' .BLKB 1 ;TASK'S DEFAULT PRIORITY
T.LBN:'L' .BLKB 3 ;LBN OF TASK LOAD IMAGE
T.LDV:'L' .BLKW 1 ;UCB ADDRESS OF LOAD DEVICE
T.PCB:'L' .BLKW 1 ;PCB ADDRESS OF TASK PARTITION
T.MXSZ:'L' .BLKW 1 ;MAXIMUM SIZE OF TASK IMAGE (MAPPED ONLY)
T.ACTL:'L' .BLKW 1 ;ADDRESS OF NEXT TASK IN ACTIVE LIST
T.SAST:'L' .BLKW 1 ;SPECIFIED AST LISTHEAD
          .BLKB 1 ;RESERVED BYTE (CURRENTLY MUST BE 0)
T.TIO:'L' .BLKB 1 ;BUFFERED I/O COUNT
T.TKSZ:'L' .BLKW 1 ;TASK SIZE (FROM L$BLDZ IN LABEL BLK) IN:
; UNMAPPED SYSTEMS - BYTES
; MAPPED SYSTEMS - 32 WORD BLOCKS
;TASK SIZE (FROM L$BMXZ IN LABEL BLK)
;FOR RSX11S SYSTEMS ONLY
; MAPPED SYSTEMS - 32 WORD BLOCKS
; UNMAPPED SYSTEMS - BYTES

$$$=. ;MARK START OF PLAS AREA

T.ATT:'L' .BLKW 2 ;ATTACHMENT DESCRIPTOR LISTHEAD
T.OFF:'L' .BLKW 1 ;OFFSET TO TASK IMAGE IN PARTITION
;IF A$$HDR IS DEFINED, THIS WORD ALSO
;INCLUDES THE LENGTH OF THE ALTERNATE
;HEADER REFRESH AREA STORED IN T.HDLN
          .BLKB 1 ;RESERVED

```

TCBDFS (Cont.)

```

T.SRCT:'L' .BLKB 1          ;SREF WITH EFN COUNT IN ALL RECEIVE QUEUES
T.RREFL:'L' .BLKW 2        ;RECEIVE BY REFERENCE LISTHEAD

      .IF NDF P$$LAS

.=$$$                                ;POINT TO START OF PLAS AREA

      .ENDC                    ;P$$LAS

      .IF NB SYSDEF

$$$=.                                ;MARK START OF PARENT OFFSPRING TASKING AREA

T.OCBH:'L' .BLKW 2          ;OFFSPRING CONTROL BLOCK LISTHEAD
T.RDCT:'L' .BLKW 1          ;OUTSTANDING OFFSPRING COUNT

      .IF NDF P$$OFF

.=$$$                                ;POINT TO START OF PARENT OFFSPRING AREA

      .ENDC                    ;P$$OFF

$$$=.                                ;MARK START OF EVENT FLAG MASK AREA

T.EFLM:'L' .BLKW 2          ;EVENT FLAG MASK WORD
                                ;EVENT FLAG MASK ADDRESS

      .IF NDF S$$STOP&T$$BUF

.=$$$                                ;POINT TO START OF EVENT FLAG MASK AREA

      .ENDC                    ;S$$STOP&T$$BUF

$$$=.

T.HDLN:'L' .BLKB 1          ;TASK HEADER LENGTH IN 32-WORD BLOCKS

      .IF NDF A$$HDR

.=$$$                                ;NOT SUPPORTED IF NDF

      .ENDC                    ;A$$HDR

$$$=.

T.GGF:'L' .BLKB 1           ;GROUP GLOBAL USE COUNT FOR TASK

      .IF NDF R$$SND&G$$EFN!A$$CLI&G$$EFN

.=$$$

      .ENDC

      .EVEN

T.LGTH='B' .                ;LENGTH OF TASK CONTROL BLOCK
T.EXT='B'0                  ;LENGTH OF TCB EXTENSION

      .IFF

```


TCBDF\$ (Cont.)

```

;+
; TASK STATUS DEFINITIONS
;
; FIRST STATUS WORD (BLOCKING BITS)
;-

TS.EXE='B' 100000 ;TASK NOT IN EXECUTION (1=YES)
TS.RDN='B' 40000 ;I/O RUN DOWN IN PROGRESS (1=YES)
TS.MSG='B' 20000 ;ABORT MESSAGE BEING OUTPUT (1=YES)
TS.NRP='B' 10000 ;TASK MAPPED TO NONRESIDENT PARTITION (1=YES)
TS.RUN='B' 4000 ;TASK IS RUNNING ON ANOTHER PROCESSOR (1=YES)
TS.HLD='B' 2000 ;TASK HALF-LOADED BY TASK LOADER
TS.STP='B' 1000 ;TASK EXTERNALLY BLOCKED VIA CLI COMMAND
TS.OUT='B' 400 ;TASK IS OUT OF MEMORY (1=YES)
TS.CKP='B' 200 ;TASK IS BEING CHECKPOINTED (1=YES)
TS.CKR='B' 100 ;TASK CHECKPOINT REQUESTED (1=YES)

;+
; TASK BLOCKING STATUS MASK
;-

TS.BLK='B' TS.CKP!TS.CKR!TS.EXE!TS.MSG!TS.NRP!TS.OUT!TS.RDN!TS.STP

;+
; SECOND STATUS WORD (STATE BITS)
;-

T2.AST='B' 100000 ;AST IN PROGRESS (1=YES)
T2.DST='B' 40000 ;AST RECOGNITION DISABLED (1=YES)
T2.CHK='B' 20000 ;TASK NOT CHECKPOINTABLE (1=YES)
T2.CKD='B' 10000 ;CHECKPOINTING DISABLED (1=YES)
T2.SEF='B' 4000 ;TASK STOPPED FOR EVENT FLAGS (1=YES)
T2.FXD='B' 2000 ;TASK FIXED IN MEMORY (1=YES)
T2.REX='B' 1000 ;ABORT AST EFFECTED OR IN PROGRESS (1=YES)
T2.CAF='B' 400 ;DYN CHECKPOINT SPACE ALLOCATION FAILURE
T2.HLT='B' 200 ;TASK IS BEING HALTED (1=YES)
T2.ABO='B' 100 ;TASK MARKED FOR ABORT (1=YES)
T2.STP='B' 40 ;SAVED T2.STP ON AST IN PROGRESS
T2.STP='B' 20 ;TASK STOPPED (1=YES)
T2.SPN='B' 10 ;SAVED T2.SPN ON AST IN PROGRESS
T2.SPN='B' 4 ;TASK SUSPENDED (1=YES)
T2.WFR='B' 2 ;SAVED T2.WFR ON AST IN PROGRESS
T2.WFR='B' 1 ;TASK IN WAITFOR STATE (1=YES)

;+
; THIRD STATUS WORD (ATTRIBUTE BITS)
;-

T3.ACP='B' 100000 ;ANCILLARY CONTROL PROCESSOR (1=YES)
T3.PMD='B' 40000 ;DUMP TASK ON SYNCHRONOUS ABORT (0=YES)
T3.REM='B' 20000 ;REMOVE TASK ON EXIT (1=YES)
T3.PRIV='B' 10000 ;TASK IS PRIVILEGED (1=YES)
T3.MCR='B' 4000 ;TASK REQUESTED AS EXTERNAL MCR FUNCTION
; (1=YES)
T3.SLV='B' 2000 ;TASK IS A SLAVE TASK (1=YES)
T3.CLI='B' 1000 ;TASK IS A COMMAND LINE INTERPRETER (1=YES)
T3.RST='B' 400 ;TASK IS RESTRICTED (1=YES)
T3.NSD='B' 200 ;TASK DOES NOT ALLOW SEND DATA

```

TCBDF\$ (Cont.)

T3.CAL='B'	100	;TASK HAS CHECKPOINT SPACE IN TASK IMAGE
T3.ROV='B'	40	;TASK HAS RESIDENT OVERLAYS
T3.NET='B'	20	;NETWORK PROTOCOL LEVEL
T3.GFL='B'	10	;TASK HAS ITS GRP GBL EVENT FLAGS LOCKED
; ='B'	4	;RESERVED FOR FUTURE USE
T3.SWS='B'	2	;RESERVED FOR USE BY SOFTWARE SERVICES
; ='B'	1	;RESERVED FOR FUTURE USE

.ENDC

.PSECT

.MACRO TCBDF\$ X,Y,Z

.ENDM

.ENDM

UCBDF\$

```

.MACRO      UCBDF$,L,B,TTDEF,SYSDF

;+
; UNIT CONTROL BLOCK
;
; THE UNIT CONTROL BLOCK (UCB) DEFINES THE STATUS OF AN INDIVIDUAL
; DEVICE UNIT AND IS THE CONTROL BLOCK THAT IS POINTED TO BY THE
; FIRST WORD OF AN ASSIGNED LUN. THERE IS ONE UCB FOR EACH DEVICE
; UNIT OF EACH DCB. THE UCB'S ASSOCIATED WITH A PARTICULAR DCB ARE
; CONTIGUOUS IN MEMORY AND ARE POINTED TO BY THE DCB. UCB'S ARE
; VARIABLE LENGTH BETWEEN DCB'S BUT ARE OF THE SAME LENGTH FOR A
; SPECIFIC DCB. TO FINISH THE TELETYPE EXAMPLE ABOVE, EACH UNIT
; ON BOTH INTERFACES WOULD HAVE A UCB.
;-

.ASECT

      .IF NB SYSDF

      .IF DF E$SDVC

      .IF DF M$SMUP      ;IS U.OWN THERE?

.=177766
      .IFF
.=177770
      .ENDC

U.IOC:'L' .BLKW 2      ;I/O COUNT SINCE MOUNT (ERROR LOG DEVS
                      ;ONLY)
U.ERSL:'L' .BLKB 1      ;SOFT ERROR LIMIT
U.ERHL:'L' .BLKB 1      ;HARD ERROR LIMIT
U.ERSC:'L' .BLKB 1      ;SOFT ERROR COUNT
U.ERHC:'L' .BLKB 1      ;HARD ERROR COUNT

      .ENDC

      .ENDC

.=177772
U.MUP:'L'      ;MULTIUSER PROTECTION FLAG WORD
U.CLI:'L' .BLKW 1 ;TCB OF COMMAND LINE INTERPRETER
U.LUIC:'L' .BLKW 1 ;LOGIN UIC - MULTI USER SYSTEMS ONLY
U.OWN:'L' .BLKW 1 ;OWNING TERMINAL - MULTI USER SYSTEMS
                      ;ONLY
U.DCB:'L' .BLKW 1 ;BACK POINTER TO DCB
U.RED:'L' .BLKW 1 ;POINTER TO REDIRECT UNIT UCB
U.CTL:'L' .BLKB 1 ;CONTROL PROCESSING FLAGS
U.STS:'L' .BLKB 1 ;UNIT STATUS
U.UNIT:'L' .BLKB 1 ;PHYSICAL UNIT NUMBER
U.ST2:'L' .BLKB 1 ;UNIT STATUS EXTENSION
U.CW1:'L' .BLKW 1 ;FIRST DEVICE CHARACTERISTICS WORD
U.CW2:'L' .BLKW 1 ;SECOND DEVICE CHARACTERISTICS WORD
U.CW3:'L' .BLKW 1 ;THIRD DEVICE CHARACTERISTICS WORD
U.CW4:'L' .BLKW 1 ;FOURTH DEVICE CHARACTERISTICS WORD
U.SCB:'L' .BLKW 1 ;POINTER TO SCB
U.ATT:'L' .BLKW 1 ;TCB ADDRESS OF ATTACHED TASK
U.BUF:'L' .BLKW 1 ;RELOCATION BIAS OF CURRENT I/O REQUEST
                      ;BUFFER ADDRESS OF CURRENT I/O REQUEST

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UCBDF\$ (Cont.)

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U.CNT='L'   .BLKW 1           ;BYTE COUNT OF CURRENT I/O REQUEST
U.ACP='B'   U.CNT+2          ;ADDRESS OF TCB OF MOUNTED ACP
U.VCB='B'   U.CNT+4          ;ADDRESS OF VOLUME CONTROL BLOCK
U.CBF='B'   U.CNT+2          ;CONTROL BUFFER RELOCATION AND ADDRESS
U.KCSR='B'   U.CNT+2          ;CSR ADDRESS OF KMC-11
U.KCS6='B'   U.KCSR+2        ;CSR+6 OF KMC-11

;
;   MAGTAPE DRIVER DEFINITIONS
;
U.SPC='B'   U.CNT+6           ;SPACING COUNT
U.SUB='B'   U.CNT+6           ;SUBCONTROLLER, PHYSICAL UNIT #.
U.FNUM='B'   U.CNT+10         ;FORMATTER NUMBER
U.FCDE='B'   U.CNT+12         ;FUNCTION CODE AND INDEX

;
;   MSCP/TMSCP DRIVER UCB OFFSETS
;
U.UTIL='B'   U.VCB+2          ;UNIT STATE WORD
;
;   DEFINITIONS FOR U.UTIL BITS
;
UU.SER='B'   1                ;SERIAL MODE
UU.RCT='B'   2                ;(DUDRV)RCT IN PROGRESS
UU.AVN='B'   4                ;UNIT IS WAITING FOR OTHER UNITS TO SPIN
                                ;DOWN
UU.GUS='B'   10               ;UNIT MUST HAVE A GUS COMMAND ISSUED
UU.ONL='B'   20               ;UNIT MUST HAVE A ONL COMMAND ISSUED
UU.SPC='B'   40               ;SPECIAL ONLINE TRANSITION
UU.ATN='B'   100              ;UNIT HAS SENT ATTENTION MESSAGE
UU.RDY='B'   200              ;UNIT IS READY
UU.ABO='B'   400              ;IF SET, XXCAN SET UU.SER FLAG FOR UNIT
UU.SIO='B'   1000             ;THIS UNIT CAN STALL I/O
UU.IOS='B'   2000             ;THIS UNIT HAS I/O STALLED
U.MEDI='B'   U.VCB+4          ;MEDIA IDENTIFIER (2 WORDS)
;
;   ALL THE FOLLOWING MSCP FIELDS APPLY ONLY TO DISK
;
U.BPKT='B'   U.VCB+10         ;UNIT BAD BLOCK PACKET WAITING LIST
;
;   CHARACTERISTICS OBTAINED FROM "GET UNIT STATUS" END PACKETS
;
U.MLUN='B'   U.VCB+14         ;MULTI-UNIT CODE
U.UNFL='B'   U.VCB+16         ;UNIT FLAGS
U.UNTI='B'   U.VCB+24         ;UNIT IDENTIFIER
U.2MED='B'   U.VCB+34         ;ORIGINAL COPY OF MEDIA IDENTIFIER
U.SHUN='B'   U.VCB+40         ;SHADOW UNIT
U.SHST='B'   U.VCB+42         ;SHADOW UNIT STATUS
U.TRCK='B'   U.VCB+44         ;UNIT TRACK SIZE
U.GRP='B'   U.VCB+46         ;UNIT GROUP SIZE
U.CYL='B'   U.VCB+50         ;UNIT CYLINDER SIZE
U.USVR='B'   U.VCB+52         ;UNIT SOFTWARE VERSION
U.UHVR='B'   U.VCB+53         ;UNIT HARDWARE VERSION
U.RCTS='B'   U.VCB+54         ;UNIT RCT TABLE SIZE
U.RBNS='B'   U.VCB+56         ;UNIT RBN 'S / TRACK
U.RCTC='B'   U.VCB+57         ;UNIT RCT COPIES

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UCBDFS\$ (Cont.)

```

;
; CHARACTERISTICS OBTAINED FROM "ONLINE" OR "SET UNIT CHARACTERISTICS"
; END PACKETS
;
U.UNSZ='B'U.VCB+60          ;UNIT SIZE
U.VSER='B'U.VCB+64          ;VOLUME SERIAL NUMBER
;
; TERMINAL DRIVER DEFINITIONS
;
.=U.BUF
U.TUX:'L' .BLKW 1           ;POINTER TO UCB EXTENSION (UCBX)
U.TSTA:'L' .BLKW 4          ;STATUS QUADRUPLE-WORD
U.TFRQ:'L' .BLKW 1          ;FORK REQUEST WORD
U.TFLK:'L' .BLKW 1          ;FORK LIST LINK WORD
U.TCHP:'L' .BLKB 1          ;CURRENT HORIZONTAL POSITION
U.TCVP:'L' .BLKB 1          ;CURRENT VERTICAL POSITION
U.UIC:'L' .BLKW 1           ;TERMINAL UIC
U.TTYP:'L' .BLKB 1          ;TERMINAL TYPE
U.TMTI:'L' .BLKB 1          ;MODEM TIMER
U.TTAB:'L' .BLKW 1          ;IF 0: U.TTAB+1 IS SINGLE-CHARACTER
                           ; TYPE-AHEAD BUFFER, CURRENTLY EMPTY
                           ;IF ODD: U.TTAB+1 IS SINGLE-CHARACTER
                           ; TYPE-AHEAD BUFFER AND HOLDS A
                           ; CHARACTER
                           ;IF NON-0 AND EVEN: POINTER TO
                           ; MULTI-CHARACTER TYPE-AHEAD BUFFER
U.CTYP:'L' .BLKB 1          ;CONTROLLER TYPE
U.TLPP:'L' .BLKB 1          ;LINES PER PAGE
U.TST5:'L' .BLKW 1          ;ADDITIONAL STATUS BITS
U.TST6:'L' .BLKW 1          ;EXTENDED I/O STATUS BITS
U.TIXL:'L' .BLKW 1          ;I/O PACKET EXTENSION LISTHEAD
U.ACB:'L' .BLKW 1           ;ANCILLARY CONTROL DRIVER BLOCK ADDR
U.AFLG:'L' .BLKW 1          ;ANCILLARY CONTROL DRIVER FLAGS WORD
U.ADMA:'L' .BLKW 1          ;ANCILLARY CONTROL DRIVER DMA BUFFER
;
; CONSOLE DRIVER DEFINITIONS
;
.=U.BUF+2
U.CTCB:'L' .BLKW 1          ;ADDRESS OF CONSOLE LOGGER TCB
U.COTQ:'L' .BLKW 2          ;I/O PACKET LIST QUEUE
U.RED2:'L' .BLKW 1          ;REDIRECT UCB ADDRESS
;
; DEFINE BITS IN STATUS WORD 1 (U.TSTA)
;
;
; I N P U T   S T A T U S
;
S1.RST='B'      1           ;READ WITH SPECIAL TERMINATORS IN
                           ;PROGRESS
S1.ESC='B'      2           ;ESCAPE SEQUENCE IN PROGRESS
S1.RSP='B'      4           ;READ WITH SPECIAL PROCESSING
S1.PTH='B'     10           ;PASS THRU IS CURRENTLY ACTIVE
S1.RNE='B'     20           ;ECHO SUPPRESSED
S1.TSY='B'     40           ;TERMINAL OUTPUT SYNC IS CURRENTLY
                           ;ENABLED

```

UCBDF\$ (Cont.)

```

S1.OBY='B'      100      ;OUTPUT BUSY
S1.IBY='B'      200      ;INPUT BUSY
S1.DPR='B'      400      ;DEFER PROCESSING OF CHAR. IN U.TECB
S1.DEC='B'     1000      ;DEFER ECHO OF CHAR. IN U.TECB
S1.IBF='B'     2000      ;BUFFERED INPUT IN PROGRESS
S1.DSI='B'     4000      ;INPUT PROCESSING DISABLED
S1.RES='B'    10000      ;ESC. SEQ PROCESSING IS ENABLED FOR THE
                        ;CURRENT READ
S1.RNF='B'    20000      ;READ NO FILTER IS ACTIVE (EDIT CHARS.
                        ;ARE DISPLAYED)
S1.TNE='B'    40000      ;TERMINATOR NO ECHO
S1.USI='B'   100000      ;UNSOLICITED INPUT IN PROGRESS

; DEFINE BITS IN STATUS WORD 2 (U.TSTA+2)
;
;   O U T P U T   S T A T U S
;
S2.RCU='B'       1      ;RESTORE CURSOR (MUST = TF.RCU)
S2.WRA='B'       6      ;CONTEXT FOR WRAP-AROUND
S2.WRB='B'       2      ;LOW BIT IN S2.WRA BIT PATTERN
S2.WAL='B'      10      ;WRITE PASS ALL (MUST = TF.WAL)
S2.BRQ='B'      20      ;BREAK-THROUGH-WRITE REQUEST IN QUEUE
S2.SRQ='B'      40      ;SPECIAL REQUEST IN QUEUE
                        ;(IO.ATT, IO.DET, SF.SMC)
S2.ORQ='B'     100      ;OUTPUT REQUEST IN QUEUE (MUST = S1.OBY)
S2.IRQ='B'     200      ;INPUT REQUEST IN QUEUE (MUST = S1.IBY)
S2.FLF='B'     400      ;FORCE LINEFEED BEFORE NEXT ECHO
S2.ELF='B'    1000      ;EAT A LINEFEED (IGNORE A LEADING LF ON
                        ;OUTPUT)
S2.CR='B'      2000      ;TRAILING CR REQUIRED ON OUTPUT
S2.OBF='B'     4000      ;BUFFERED OUTPUT IN PROGRESS
S2.PCU='B'    10000      ;POSITION CURSOR BEFORE WRITE
S2.BEL='B'    20000      ;BELL PENDING
S2.CTO='B'    40000      ;OUTPUT STOPPED BY CTRL-O 266.
S2.CTS='B'   100000      ;OUTPUT STOPPED BY CTRL-S

; DEFINE BITS IN STATUS WORD 3 (U.TSTA+4)
;
;   T E R M I N A L   O P E R A T I O N   C H A R A C T E R I S T I C S
;
S3.ACR='B'       1      ;WRAP-AROUND (AUTOMATIC CR-LF) REQUIRED
S3.TAB='B'       2      ;TYPE-AHEAD BUFFER ALLOCATION REQUESTED
S3.CTC='B'       4      ;TERMINAL WANTS CLI TO HAVE ^C NOTIFICATION
S3.RAL='B'      10      ;TERMINAL IS IN READ-PASS-ALL MODE
S3.NEC='B'      20      ;NO ECHO
S3.TSY='B'      40      ;TERMINAL SYNC
S3.8BC='B'     100      ;PASS 8 BITS ON INPUT
S3.FDX='B'     200      ;LINE IS IN FULL DUPLEX MODE
S3.MHE='B'     400      ;NOTIFY ATTACHED TASK OF MODEM HANG-UP
S3.ICE='B'    1000      ;INPUT COUNT STATE ENABLED
S3.TME='B'    2000      ;TERMINAL MANAGEMENT MODE ENABLED
S3.PTH='B'    4000      ;PASS THROUGH REQUESTED
S3.RES='B'   10000      ;TASK WANTS ESCAPE SEQUENCES
S3.PPT='B'   20000      ;TERMINAL HAS PRINTER PORT
S3.RUB='B'   40000      ;RUBOUT SEQUENCE IN PROGRESS (NON-SCOPE)

```


UCBDF\$ (Cont.)

```

;
; DEFINE BITS IN STATUS WORD 4 (U.TSTA+6)
;
;
; TERMINAL ATTRIBUTE CHARACTERISTICS
;
S4.HFL='B'      7          ;HORIZONTAL FILL REQUIREMENT
S4.VFL='B'     10          ;VERTICAL FILL REQUIREMENT
S4.HFF='B'     20          ;HARDWARE FORM-FEED PRESENT
S4.HHT='B'     40          ;HARDWARE HORIZONTAL TAB PRESENT
S4.DLO='B'    100          ;DIAL-OUT LINE (IMPLIES U2.RMT)
S4.HSY='B'    200          ;HOST/TERMINAL SYNCHRONIZATION ENABLED
                          ;(1=YES)
S4.ANI='B'    400          ;ANSI CRT TERMINAL
S4.AVO='B'   1000          ;VT100-FAMILY TERMINAL DISPLAY
S4.BLK='B'   2000          ;BLOCK MODE TERMINAL
S4.DEC='B'   4000          ;DIGITAL CRT TERMINAL
S4.EDT='B'  10000          ;TERMINAL HAS LOCAL EDITING FUNCTIONS
S4.RGS='B'  20000          ;TERMINAL SUPPORTS REGIS GRAPHICS
S4.SFC='B'  40000          ;TERMINAL SUPPORTS SOFT CHARACTERS (DRCS)
S4.ABD='B' 100000          ;AUTO-BAUD SPEED DETECTION ENABLED
;
;
; DEFINE BITS IN STATUS WORD U.TST5
;
; ADDITIONAL STATUS CHARACTERISTICS
;
;
S5.SW1='B'      1          ;FIRST TERMINAL MANAGEMENT SWITCH
                          ;CHARACTER HAS BEEN SEEN
S5.TMM='B'      2          ;TERMINAL IN TERMINAL MANAGEMENT MODE
S5.XOF='B'      4          ;SEND AN XOFF AT FIRST OPPORTUNITY
S5.XON='B'     10          ;SEND AN XON AT FIRST OPPORTUNITY
S5.HPC='B'     14          ;OUTPUT OF HIGH PRIORITY CHARACTERS
                          ;REQUESTED
S5.HPO='B'     20          ;HIGH PRIORITY OUTPUT IN PROGRESS
S5.OXF='B'     40          ;XOFF HAS BEEN OUTPUT
S5.ITI='B'    100          ;IMMEDIATE TIMEOUT ON INPUT
;
S5.RPO='B'    2000          ;READ W/PROMPT OUTPUT IN PROGRESS
S5.VER='B'  10000          ;LAST CHAR. IN TYPE-AHEAD BUFFER
                          ;HAS PARITY ERROR
S5.BCC='B'   20000          ;LAST CHAR. IN TYPE-AHEAD BUFFER
                          ;HAS FRAMING ERROR
S5.DAO='B'   40000          ;LAST CHAR. IN TYPE-AHEAD BUFFER
                          ;HAS DATA OVERRUN ERROR
                          ;NOTE - THE 3 BITS ABOVE MUST CORRESPOND
                          ;TO THE RESPECTIVE ERROR FLAGS IN THE
                          ;HARDWARE RECEIVE BUFFER
S5.ABP='B' 100000          ;AUTO-BAUD SPEED DETECTION IN PROGRESS
;
;
; DEFINE BITS IN EXTENDED I/O STATUS WORD U.TST6
;
;
S6.EIO='B'      400          ;READ WAS AN EXTENDED I/O
S6.RLU='B'     1000          ;READ WITH LOWER CASE TO UPPER CASE
                          ;CONVERSION
S6.RDI='B' 100000          ;READ WITH DEFAULT INPUT

```

UCBDFS\$ (Cont.)

;

;

.PSECT

;+

; DEVICE TABLE STATUS DEFINITIONS

;

; DEVICE CHARACTERISTICS WORD 1 (U.CW1) DEVICE TYPE DEFINITION BITS.

;-

DV.REC='B'	1	;RECORD ORIENTED DEVICE (1=YES)
DV.CCL='B'	2	;CARRIAGE CONTROL DEVICE (1=YES)
DV.TTY='B'	4	;TERMINAL DEVICE (1=YES)
DV.DIR='B'	10	;FILE STRUCTURED DEVICE (1=YES)
DV.SDI='B'	20	;SINGLE DIRECTORY DEVICE (1=YES)
DV.SQD='B'	40	;SEQUENTIAL DEVICE (1=YES)
DV.MSD='B'	100	;MASS STORAGE DEVICE (1=YES)
DV.UMD='B'	200	;USER MODE DIAGNOSTICS SUPPORTED (1=YES)
DV.MBC='B'	400	;DEVICE IS ON MASSBUS CONTROLLER (1=YES)
DV.EXT='B'	400	;DEVICE ON EXTENDED ADDRESSING CONTROLLER
DV.SWL='B'	1000	;UNIT SOFTWARE WRITE LOCKED (1=YES)
DV.ISP='B'	2000	;INPUT SPOOLED DEVICE (1=YES)
DV.OSP='B'	4000	;OUTPUT SPOOLED DEVICE (1=YES)
DV.PSE='B'	10000	;PSEUDO DEVICE (1=YES)
DV.COM='B'	20000	;DEVICE IS MOUNTABLE AS COM CHANNEL
		; (1=YES)
DV.F11='B'	40000	;DEVICE IS MOUNTABLE AS F11 DEVICE (1=YES)
DV.MNT='B'	100000	;DEVICE IS MOUNTABLE (1=YES)

;+

; TERMINAL DEPENDENT CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS

;-

U2.DH1='B'	100000	;UNIT IS A MULTIPLEXER (1=YES)
U2.DJ1='B'	40000	;UNIT IS A DJ11 (1=YES)
U2.RMT='B'	20000	;UNIT IS REMOTE (1=YES)
U2.HFF='B'	10000	;UNIT HANDLES HARDWARE FORM FEEDS (1=YES)
U2.L8S='B'	10000	;OLD NAME FOR U2.HFF
U2.NEC='B'	4000	;DON'T ECHO SOLICITED INPUT (1=YES)
U2.CRT='B'	2000	;UNIT IS A CRT (1=YES)
U2.ESC='B'	1000	;UNIT GENERATES ESCAPE SEQUENCES (1=YES)
U2.LOG='B'	400	;USER LOGGED ON TERMINAL (0=YES)
U2.SLV='B'	200	;UNIT IS A SLAVE TERMINAL (1=YES)
U2.DZ1='B'	100	;UNIT IS A DZ11 (1=YES)
U2.HLD='B'	40	;TERMINAL IS IN HOLD SCREEN MODE (1=YES)
U2.AT='B'	20	;MCR COMMAND AT. BEING PROCESSED (1=YES)
U2.PRIV='B'	10	;UNIT IS A PRIVILEGED TERMINAL (1=YES)
U2.L3S='B'	4	;UNIT IS A LA30S TERMINAL (1=YES)
U2.SCS='B'	4	;SCS-11 COMMAND TERMINAL (1=YES)
U2.VT5='B'	2	;UNIT IS A VT05B TERMINAL (1=YES)
U2.LWC='B'	1	;LOWER CASE TO UPPER CASE CONVERSION
		; (0=YES)

;+

; BIT DEFINITIONS FOR U.MUP (SYSTEMS WITH ALTERNATE CLI SUPPORT ONLY)

;-

UCBDF\$ (Cont.)

```

UM.OVR='B' 1 ;OVERRIDE CLI INDICATOR
UM.CLI='B' 36 ;CLI INDICATOR BITS
UM.DSB='B' 200 ;TERMINAL DISABLED SINCE CLI ELIMINATED
UM.NBR='B' 400 ;NO BROADCAST

;+
; RH11-RS03/RS04 CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-

U2.R04='B' 100000 ;UNIT IS A RS04 (1=YES)

;+
; RH11-TU16 CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-

U2.7CH='B' 10000 ;UNIT IS A 7 CHANNEL DRIVE (1=YES)

;+
; TERMINAL DEPENDENT CHARACTERISTICS WORD 3 (U.CW3) BIT DEFINITIONS
;-

U3.UPC='B' 20000 ;UPCASE OUTPUT FLAG
U3.PAR='B' 40000 ;PARITY GENERATION AND CHECKING
U3.OPA='B' 100000 ;PARITY SENSE (1=ODD PARITY)

;+
; TERMINAL DEPENDENT CHARACTERISTICS WORD 4 (U.CW4) BIT DEFINITIONS
;-

U4.CR='B' 100 ;LOOK FOR CARRIAGE RETURN

;+
; UNIT CONTROL PROCESSING FLAG DEFINITIONS
;-

UC.ALG='B' 200 ;BYTE ALIGNMENT ALLOWED (1=NO)
UC.NPR='B' 100 ;DEVICE IS AN NPR DEVICE (1=YES)
UC.QUE='B' 40 ;CALL DRIVER BEFORE QUEUING (1=YES)
UC.PWF='B' 20 ;CALL DRIVER AT POWERFAIL ALWAYS (1=YES)
UC.ATT='B' 10 ;CALL DRIVER ON ATTACH/DETACH (1=YES)
UC.KIL='B' 4 ;CALL DRIVER AT I/O KILL ALWAYS (1=YES)
UC.LGH='B' 3 ;TRANSFER LENGTH MASK BITS

;+
; UNIT STATUS BIT DEFINITIONS
;-

US.BSY='B' 200 ;UNIT IS BUSY (1=YES)
US.MNT='B' 100 ;UNIT IS MOUNTED (0=YES)
US.FOR='B' 40 ;UNIT IS MOUNTED AS FOREIGN VOLUME (1=YES)
US.MDM='B' 20 ;UNIT IS MARKED FOR DISMOUNT (1=YES)
US.PWF='B' 10 ;POWERFAIL OCCURRED (1=YES)

;+
; CARD READER DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.ABO='B' 1 ;UNIT IS MARKED FOR ABORT IF NOT READY
; (1=YES)
US.MDE='B' 2 ;UNIT IS IN 029 TRANSLATION NODE (1=YES)

```

UCBDF\$ (Cont.)

```

;+
; FILES-11 DEPENDENT UNIT STATUS BITS
;-

US.WCK='B' 10          ;WRITE CHECK ENABLED (1=YES)
US.SPU='B' 2           ;UNIT IS SPINNING UP (1=YES)
US.VV='B' 1            ; VOLUME VALID IS SET (1=YES)

;+
; KMC-11-LP DEPENDENT UNIT STATUS BITS
;-

US.KPF='B' 1           ;KMC-11 POWERFAIL INTERLOCK

;+
; TERMINAL DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

      .IF NB TTDEF

      .IF DF T$$CPW

US.CRW='B' 4           ;UNIT IS WAITING FOR CARRIER (1=YES)
US.DSB='B' 2           ;UNIT IS DISABLED (1=YES)
US.OIU='B' 1           ;OUTPUT INTERRUPT IS UNEXPECTED ON UNIT
                        ; (1=YES)

      .IFF             ;T$$CPW

US.DSB='B' 10          ;UNIT IS DISABLED (1=YES)
US.CRW='B' 4           ;UNIT IS WAITING FOR CARRIER (1=YES)
US.ECH='B' 2           ;UNIT HAS ECHO IN PROGRESS (1=YES)
US.OUT='B' 1           ;UNIT IS EXPECTING OUTPUT INTERRUPT
                        ; (1=YES)

      .ENDC

      .ENDC            ;TTDEF

;+
; LPS11 DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.FRK='B' 2           ;FORK IN PROGRESS (1=YES)
US.SHR='B' 1           ;SHAREABLE FUNCTION IN PROGRESS (0='B'YES)

;+
; MAGTAPE DEPENDENT UNIT STATUS BITS
;-

US.LAB='B' 4           ; UNIT HAS LABELED TAPE ON IT (1=YES)
US.BSP='B' 2           ; INTERNAL BACKSPACE IN PROGRESS (1=YES)

;+
; UNIT STATUS EXTENSION (U.ST2) BIT DEFINITIONS
;-

```


UCBDF\$ (Cont.)

```

US.OFL='B'  1          ;UNIT OFFLINE (1=YES)
US.RED='B'  2          ;UNIT REDIRECTABLE (0=YES)
US.PUB='B'  4          ;UNIT IS PUBLIC DEVICE (1=YES)
US.UMD='B' 10          ;UNIT ATTACHED FOR DIAGNOSTICS (1=YES)

```

```

;+

```

```

; MAG TAPE DENS SUPPORT IDENT IN CHAR WORD 3 (U.CW3) DEFENITION
;   ASSIGNMENTS PER NUMERICAL SEQUENCE 0 - 255.
;-

```

```

UD.UNS='B'  0          ; UNSUPPORTED
UD.200='B'  1          ; 200BPI, 7 TRACK
UD.556='B'  2          ; 556BPI, 7 TRACK
UD.800='B'  3          ; 800BPI, 7 OR 9 TRACK
UD.160='B'  4          ;1600BPI, 9 TRACK
UD.625='B'  5          ;6250BPI, 9 TRACK
UD.8K='B'   6          ;8K BPI - SERIAL, SERPENTINE RECORDING

```

```

.MACRO' UCBDF$,X,Y,Z,ZZ

```

```

.ENDM

```

```

.ENDM

```


APPENDIX C

RSX-11M-PLUS SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS

This appendix describes the RSX-11M-PLUS system macros that supply symbolic offsets for data structures listed in Table C-1.

The data structures are defined by macros in the Executive macro library. To reference any of the data structure offsets from your code, include the macro name in an .MCALL directive and invoke the macro. For example:

```
.MCALL DCBDF$
DCBDF$                                ;Define DBC offsets
```

NOTE

All physical offsets and bit definitions are subject to change in future releases of the operating system. Code that accesses system data structures should always use the symbolic offsets rather than the physical offsets.

The first two arguments, <:> and <=>, make all definitions global. If they are left blank, the definitions will be local.

All of these macros are in the Executive macro library LB:[1,1]EXEMC.MLB. All except F11DF\$, ITBDF\$, MTADF\$, OLRDF\$, and SHDDF\$ are also in the Executive definition library LB:[1,1]EXELIB.OLB.

Table C-1
Summary of System Data Structure Macros

Macro Arguments	Data Structures
ABODF\$ <:>,<=>	Task abort and termination notification message codes
ACNDF\$ <:>,<=>	Accounting data structures (user account block, task account block, system account block)
CLKDF\$ <:>,<=>	Clock queue control block
CTBDF\$ <:>,<=>	Controller table

(Continued on next page)

RSX-11M-PLUS SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS

Table C-1 (Cont.)
Summary of System Data Structure Macros

Macro Arguments	Data Structures
DCBDF\$ <:,>,<=>	Device Control Block
EPKDF\$ <:,>,<=>	Error message block
EVNDF\$ <:,>,<=>	Terminal Software Architecture (TSA) event packet definitions
F11DF\$ <:,>,<=>	FILES-11 data structures (Volume Control Block, mount list entry, File Control Block, file window block, locked block list node)
HDRDF\$ <:,>,<=>	Task header and window block
HWDDF\$ <:,>,<=>	Hardware register addresses and feature mask definitions
ITBDF\$ <:,>,<=>	Interrupt transfer block
KRBDF\$ <:,>,<=>	Controller request block
LCBDF\$ <:,>,<=>	Logical assignment control block
MTADF\$ <:,>,<=>	ANSI magtape data structures (volume set control block)
OLRDF\$	On-line reconfiguration interface
PCBDF\$ <:,>,<=>	Partition Control Block and attachment descriptor
PKTDF\$ <:,>,<=>	I/O packet, AST control block, offspring control block, group global event flag control block, and CLI parser block
SCBDF\$ <:,>,<=>	Status Control Block and UMR assignment block
SHDDF\$ <:,>,<=>	Shadow recording linkage block
TCBDF\$ <:,>,<=>	Task Control Block
UCBDF\$ <:,>,<=>,TTDEF	Unit Control Block

ABODF\$

```

.MACRO ABODF$,L,B

;+
; TASK ABORT CODES
;
; NOTE: S.COAD-S.CFLT ARE ALSO SST VECTOR OFFSETS
;-

S.CACT='B'-4.          ;TASK STILL ACTIVE
S.CEXT='B'-2.          ;TASK EXITED NORMALLY
S.COAD='B'0.           ;ODD ADDRESS AND TRAPS TO 4
S.CSGF='B'2.           ;SEGMENT FAULT
S.CBPT='B'4.           ;BREAK POINT OR TRACE TRAP
S.CIOT='B'6.           ;IOT INSTRUCTION
S.CILI='B'8.           ;ILLEGAL OR RESERVED INSTRUCTION
S.CEMT='B'10.          ;NON RSX EMT INSTRUCTION
S.CTRP='B'12.          ;TRAP INSTRUCTION
S.CFLT='B'14.          ;11/40 FLOATING POINT EXCEPTION
S.CSST='B'16.          ;SST ABORT-BAD STACK
S.CAST='B'18.          ;AST ABORT-BAD STACK
S.CABO='B'20.          ;ABORT VIA DIRECTIVE
S.CLRf='B'22.          ;TASK LOAD REQUEST FAILURE
S.CCRF='B'24.          ;TASK CHECKPOINT READ FAILURE
S.IOMG='B'26.          ;TASK EXIT WITH OUTSTANDING I/O
S.PRTY='B'28.          ;TASK MEMORY PARITY ERROR
S.CPMD='B'30.          ;TASK ABORTED WITH PMD REQUEST
S.CELV='B'32.          ;TI: VIRTUAL TERMINAL WAS ELIMINATED
S.CINS='B'34.          ;TASK INSTALLED IN 2 DIFFERENT SYSTEMS
S.CAFF='B'36.          ;TASK ABORTED DUE TO BAD AFFINITY (REQUIRED
                        ;BUS RUNS ARE OFFLINE OR NOT PRESENT)
S.CCSM='B'38.          ;BAD CSM PARAMETERS OR BAD STACK
S.COTL='B'40.          ;TASK HAS RUN OVER ITS TIME LIMIT
S.CTKN='B'42.          ;ABORT VIA DIRECTIVE WITH NO TKTN MESSAGE

;
; TERMINATION CODES FOR BOM$
;
; NOTE:
;
; THE NORMAL TKTN ERROR CODES SPAN -4 THROUGH 42. THE BOM CODES,
; ALTHOUGH DEFINED FOR THE TASK, ETC, AS 0 THROUGH N, ARE PASSED TO
; TKTN AS -127 THROUGH -127+N. AN UNRECOGNIZED CODE IS PASSED AS -128,
; UNKNOWN ERROR.
;

S.BUNK='B'-128.        ;UNKNOWN BOM$ ERROR
S.BFEI='B'0.           ;ERROR IN HIGH LEVEL LANGUAGE INTERFACE
S.BOVl='B'1.           ;LOAD OVERLAY FAILURE

;
; KEEP THE FOLLOWING DEFINED AS THE HIGHEST CODE IN USE
;

S.BHI='B'1.            ;HIGHEST ACCEPTABLE BOM$ CODE

;
; BIT DEFINITIONS FOR BOM$ FLAGS WORD
;
S.BBIF='B'1.          ;ENABLE CONDITIONAL BREAKPOINT

```

ABODF\$ (Cont.)

```

;
; TASK TERMINATION NOTIFICATION MESSAGE CODES
;

T.NDNR='B'0           ;DEVICE NOT READY
T.NDSE='B'2           ;DEVICE SELECT ERROR
T.NCWF='B'4           ;CHECKPOINT WRITE FAILURE
T.NCRE='B'6           ;CARD READER HARDWARE ERROR
T.NDMO='B'8           ;DISMOUNT COMPLETE
T.NUER='B'10          ;UNRECOVERABLE ERROR
T.NLDN='B'12          ;LINK DOWN (NETWORKS)
T.NLUP='B'14          ;LINK UP (NETWORKS)
T.NCFI='B'16          ;CHECKPOINT FILE INACTIVE
T.NUDE='B'18          ;UNRECOVERABLE DEVICE ERROR
T.NMPE='B'20          ;MEMORY PARITY ERROR
T.NKLF='B'22          ;UCODE LOADER NOT INSTALLED
T.NAAF='B'24          ;ACCOUNTING ALLOCATION FAILURE
T.NTAF='B'26          ;ACCOUNTING TAB ALLOCATION FAILURE
T.NDEB='B'28          ;TASK HAS NO DEBUGGING AID
T.NRCT='B'30          ;REPLACEMENT CONTROL TASK NOT INSTALLED
T.NWBL='B'32          ;WRITE BACK CACHING DATA LOST
                       ;UNIT WRITE LOCKED
T.NVER='B'34          ;MOUNT VERIFICATION TASK NOT INSTALLED
T.NIOS='B'36          ;I/O STALLED TO DEVICE
T.NIOR='B'38          ;I/O RESUMING ON DEVICE

```

```

.MACRO ABODF$ X,Y
.ENDM
.ENDM

```


ACNDFS

```

.MACRO ACNDFS,L,B

;+
; ACCOUNTING BLOCK OFFSET AND STATUS DEFINITIONS
; FOR EACH TRANSACTION TYPE.
;
; HEADER COMMON TO ALL TRANSACTIONS
;-

.ASECT

.=0

B.LNK:'L'.BLKW 1 ;LINK TO NEXT IN SYSLOG QUEUE
B.TYP:'L'.BLKB 1 ;TRANSACTION TYPE
B.LEN:'L'.BLKB 1 ;TRANSACTION LENGTH
B.TIM:'L'.BLKW 3 ;ENDING TIME OF TRANSACTION
B.HID='B'. ;START OF HEADER IDENTIFICATION AREA
B.UID:'L'.BLKW 2 ;UNIQUE SESSION IDENT
; FIRST WORD-RAD50, SECOND-BINARY
B.ACN:'L'.BLKW 1 ;ACCOUNT NUMBER
B.TID:'L'.BLKB 1 ;ASCII TERMINAL TYPE (V,T,B OR C)
; (VIRTUAL,REAL,BATCH, OR CONSOLE)
.BLKB 1 ;UNIT NUMBER
B.HEND='B'. ;END OF HEADER ID AREA
$$SHLN=. ;HEADER LENGTH

;+
; ACCUMULATION FIELDS FOR TAB, UAB, AND SAB
;-

B.CPU:'L'.BLKW 2 ;TOTAL CPU TIME USED
B.DIR:'L'.BLKW 2 ;TOTAL DIRECTIVE COUNT
B.QIO:'L'.BLKW 2 ;TOTAL QIO$ COUNT
B.TAS:'L'.BLKW 2 ;TOTAL TASK COUNT
B.MEM:'L'.BLKW 3 ;RESERVED
B.BEG:'L'.BLKW 3 ;BEGINNING/LOGIN TIME
B.CPUL:'L'.BLKW 2 ;CPU LIMIT
B.PNT:'L'.BLKW 1 ;POINTER TO HIGHER LEVEL TOTALS
B.STM:'L'.BLKB 1 ;STATUS MASK
$$TLN=. ;TOTAL'S LENGTH

;+
; USER ACCOUNT BLOCK (UAB)
; NOTE: UAB'S MUST END ON A WORD BOUNDARY
;-

.=$$TLN ;START AFTER TOTALS
B.USE:'L'.BLKB 1 ;USE COUNT
B.ACT:'L'.BLKW 1 ;NUMBER OF CURRENTLY ACTIVE TASKS
B.UUIC:'L'.BLKW 1 ;LOGIN UIC
B.UCB:'L'.BLKW 1 ;POINTER TO UCB
B.LGO:'L'.BLKW 3 ;LOGOFF TIME
B.ULNK:'L'.BLKW 1 ;LINK TO NEXT UAB
B.RNA:'L'.BLKW 3 ;LOC IN SYSTEM ACCNT FILE
; (OFFSET,VBN-HI,VBN-LO)

```

ACNDF\$ (Cont.)

```

B.NAM: 'L'.BLKB 14.      ;LAST NAME OF USER
                        .BLKB 1      ;FIRST INITIAL OF USER
                        .BLKB 1      ;FLAG BYTE FOR UAB (bs.sil) etc.
B.LDS: 'L'.BLKB 10.      ;LOGIN DIRECTORY STRING
B.ULEN= 'B'.            ;UAB LENGTH
$$$= <+.77>/100         ;UAB LENGTH (ROUNDED UP TO 32 WORD BOUND)

```

```

;+
; TASK ACCOUNT BLOCK (TAB)
;     NOTE: THE TAB MUST END ON A WORD BOUNDARY
;-

```

```

.=$$$TLN                ;STARTS AFTER TOTALS
B.PRI: 'L'.BLKB 1       ;HIGHEST RUNNING PRIORITY
B.TNAM: 'L'.BLKW 2      ;TASK NAME
B.TCB: 'L'.BLKW 1       ;TCB ADDRESS
B.TST3: 'L'.BLKW 1      ;T.ST3 FROM TASK'S TCB
                        .BLKW 1      ;RESERVED FOR FUTURE STATUS BITS
B.CUIC: 'L'.BLKW 1      ;CURRENT UIC OF TASK
B.PUIC: 'L'.BLKW 1      ;PROTECTION UIC OF TASK
B.CTXT: 'L'.BLKW 2      ;NUMBER OF CONTEXT LOADS
B.TCKP: 'L'.BLKW 2      ;TIMES TASK HAS BEEN CHECKPOINTED
B.OVLY: 'L'.BLKW 2      ;NUMBER OF DISK OVERLAY LOADS
B.EXST: 'L'.BLKW 2      ;EXIT STATUS AND ABORT CODE
B.TLEN= 'B'.            ;TAB LENGTH
B.TBLK= 'B'<+.77>/100   ;NUMBER OF SEC POOL BLOCKS IN TAB

```

```

;+
; SYSTEM ACCOUNT BLOCK (SAB)
;-

```

```

.=$$$TLN                ;START AFTER TOTALS
B.SHDN: 'L'.BLKB 1      ;ACCOUNTING SHUTDOWN REASON CODE
B.UHD: 'L'.BLKW 1       ;UAB LISTHEAD
B.ULO: 'L'.BLKW 1       ;NUMBER OF USERS CURRENTLY LOGGED ON
B.ULT: 'L'.BLKW 2       ;TOTAL NUMBER OF LOGONS
B.CKP: 'L'.BLKW 2       ;TOTAL NUMBER OF CHECKPOINTS
B.SHF: 'L'.BLKW 2       ;TOTAL NUMBER OF SHUFFLER RUNS
B.RND: 'L'.BLKW 2       ;NUMBER OF CPU INTERVALS ROUNDED UP TO 1
B.FID: 'L'.BLKW 3       ;FILE-ID OF TRANSACTION FILE
B.DVNM: 'L'.BLKB 2      ;DEVICE OF TRANSACTION FILE
B.UNIT: 'L'.BLKW 1      ;UNIT OF TRANSACTION FILE
B.EXTS: 'L'.BLKW 1      ;EXTEND SIZE FOR TRANSACTION FILE
B.LSCN: 'L'.BLKW 3      ;TIME OF LAST SCAN
B.SCNR: 'L'.BLKW 1      ;SCAN RATE IN SECONDS
B.DSCN: 'L'.BLKW 1      ;STATISTICAL SCAN RATE (IN SEC)
B.STSP: 'L'.BLKW 2      ;RESERVED
B.SYSM: 'L'.BLKW 1      ;RESERVED
B.CKUS: 'L'.BLKW 3      ;RESERVED
B.CKSP: 'L'.BLKW 2      ;RESERVED
B.CKAL: 'L'.BLKW 1      ;RESERVED
B.SLEN= 'B'.            ;SAB LENGTH

```

```

; NEW FIELDS FOR EXTENDED ACCOUNTING

```


ACNDFS\$ (Cont.)

```

B.CPUT:'L'.BLKW 8.      ;CPU TIME USED PER PROCESSOR
B.CTXP:'L'.BLKW 8.      ;NUMBER OF CONTEXT SWITCHES (PER PROC)
B.IDCT:'L'.BLKW 8.      ;NUMBER OF IDLE LOOP ENTRIES (PER PROC)
B.QIOC:'L'.BLKW 8.      ;NUMBER OF I/O INITIATIONS (PER PROC)
B.MIOC:'L'.BLKW 8.      ;MASS STORE I/O COMPLETIONS (PER PROC)
B.AIOC:'L'.BLKW 8.      ;ALL I/O COMPLETIONS (PER PROC)
B.IPSN:'L'.BLKW 8.      ;IP INTERRUPTS SENT (PER PROC)
B.IPRC:'L'.BLKW 8.      ;IP INTERRUPTS RCVD (PER PROC)
B.CKEX:'L'.BLKW 2       ;CHECKPOINT DUE TO EXTEND TASKS
B.CFCL:'L'.BLKW 2       ;CALLS TO CFORK
B.CFRK:'L'.BLKW 2       ;CFORK FORKS
B.TLOD:'L'.BLKW 2       ;TASK LOADS
B.RLOD:'L'.BLKW 2       ;REGION LOADS
                        .BLKB 82. ;BUMP SIZE TO NEXT 32 WORD BLOCK
B.SSBL=-B.SLEN          ;EXTRA LENGTH OF SYSTEM STATISTICS BLOCK
$$$=<.+77>/100          ;SAB LENGTH (ROUNDED UP TO 32 WORD BOUND)

;+
; SYSLOG STARTUP TRANSACTION
;-

.= $$$HLN               ;START AFTER HEADER
B.SSLN='B'              ;TRANSACTION LENGTH

;+
; CRASH RECOVERY TRANSACTION
;-

.= $$$HLN               ;START AFTER STANDARD HEADER
B.CTLS:'L'.BLKW 3       ;TIME OF LAST SCAN BEFORE CRASH
B.CSRT:'L'.BLKW 1       ;SCAN RATE BEFORE CRASH
B.CRSN:'L'.BLKB 60.     ;ASCII TEXT EXPLAINING CRASH
B.CLEN='B'.             ;TRANSACTION LENGTH

;+
; INVALID LOGIN TRANSACTION
;-

.= $$$HLN               ;
B.INAM:'L'.BLKB 14.     ;NAME FROM LOGIN LINE
B.IUIC:'L'.BLKB 6.      ;UIC FROM LOGIN LINE
B.IPSW:'L'.BLKB 6.      ;PASSWORD FROM LOGIN LINE
B.ILEN='B'.             ;TRANSACTION LENGTH

;+
; DEVICE TRANSACTIONS (ALLOCATION, DEALLOCATION, MOUNT, AND DISMOUNT)
;-

.= $$$HLN               ;
B.DNAM:'L'.BLKW 1       ;ASCII DEVICE NAME
B.DUNT:'L'.BLKB 1       ;OCTAL DEVICE UNIT NUMBER
B.DLEN='B'.             ;TRANSACTION LENGTH FOR ALL, DEA, AND DMO
                        .BLKB 1 ;UNUSED BYTE

```

ACNDF\$ (Cont.)

```

B.DLBL:'L'.BLKW 6      ;VOLUME LABEL
B.DMST:'L'.BLKW 1      ;MOUNT STATUS BITS
B.DUIC:'L'.BLKW 1      ;OWNER UIC
B.DVPR:'L'.BLKW 1      ;VOLUME PROTECTION CODE
B.DACP:'L'.BLKW 2      ;NAME OF ACP FOR DEVICE
B.MLEN='B'.            ;LENGTH OF MOUNT TRANSACTION

;+
; STATUS BITS FOR MOUNT STATUS MASK (B.DMST)
;-

BM.SHR='B'1            ;DEVICE IS MOUNTED SHARED
BM.NOS='B'2            ;DEVICE IS MOUNTED NOSHARE
BM.SYS='B'4            ;DEVICE IS MOUNTED FOR THE SYSTEM (PUBLIC)
BM.FOR='B'10           ;DEVICE IS MOUNTED FOREIGN

;+
; SYSTEM TIME CHANGE TRANSACTION
;-

.=      $$$HLN        ;
B.TOLD:'L'.BLKB 6      ;OLD TIME (YR, MON, DAY, HR, MIN, SEC)
B.TNEW:'L'.BLKB 6      ;NEW TIME (YR, MON, DAY, HR, MIN, SEC)
B.TMLN='B'.            ;TRANSACTION LENGTH

;+
; PRINT DESPOOLER TRANSACTION
;-

.=      $$$HLN        ;START AFTER HEADER
B.PNAM:'L'.BLKW 3      ;PRINT JOB NAME (RAD50)
B.PPGS:'L'.BLKW 1      ;PAGE COUNT
B.PNFI:'L'.BLKW 1      ;NUMBER OF FILES PRINTED
B.PFRM:'L'.BLKB 1      ;FORM NUMBER
B.PPRI:'L'.BLKB 1      ;PRINT PRIORITY
B.PDEV:'L'.BLKW 1      ;PRINT DEVICE NAME (ASCII)
B.PPUN:'L'.BLKB 1      ;UNIT NUMBER OF PRINT DEVICE
B.PLEN='B'.            ;TRANSACTION LENGTH

;+
; CARD READER SPOOLING TRANSACTION
;-

.=      $$$HLN        ;START AFTER HEADER
B.RNAM:'L'.BLKW 3      ;BATCH OR PRINT JOB NAME
B.RCDS:'L'.BLKW 1      ;NUMBER OF CARDS READ
B.RDEV:'L'.BLKW 1      ;READER DEVICE NAME (ASCII)
B.RUNT:'L'.BLKB 1      ;UNIT NUMBER OF READER DEVICE
B.RSOP:'L'.BLKB 1      ;SUBMIT OR PRINT (0=SUBMIT, 1=PRINT)
B.RLEN='B'.            ;TRANSACTION LENGTH

;+
; LOGIN TRANSACTION
;-

```


ACNDFS\$ (Cont.)

```

.=          $$$HLN                ;START AFTER HEADER
B.LUIC:'L'.BLKW 1                ;LOGIN UIC
B.LNAM:'L'.BLKB 14.              ;USER'S LAST NAME
                                ;AND FIRST INITIAL
B.LLEN='B'.                      ;TRANSACTION LENGTH

;+
;  RESET TRANSACTION PARAMETERS
;-

.=          $$$HLN                ;AFTER HEADER
B.OFID:'L'.BLKW 3                ;FILE-ID OF OLD TRN. FILE
B.ODNM:'L'.BLKB 2                ;DEVICE OF OLD TRN. FILE
B.OUNT:'L'.BLKW 1                ;UNIT OF OLD TRN. FILE
B.NFID:'L'.BLKW 3                ;FILE-ID OF NEW TRN. FILE
B.NDNM:'L'.BLKB 2                ;DEVICE OF NEW TRN. FILE
B.NUNT:'L'.BLKW 1                ;UNIT OF NEW TRN. FILE
B.OEXS:'L'.BLKW 1                ;EXT. SIZE FOR OLD TRN. FILE
B.NEXS:'L'.BLKW 1                ;EXT. SIZE FOR NEW TRN. FILE
B.OSCR:'L'.BLKW 1                ;OLD SCAN RATE IN SECONDS
B.NSCR:'L'.BLKW 1                ;NEW SCAN RATE IN SECONDS
B.ODSC:'L'.BLKW 1                ;OLD STATISTICAL SCAN RATE
B.NDSC:'L'.BLKW 1                ;NEW STATISTICAL SCAN RATE
B.RTLN='B'.

;+
;  TRANSACTION TYPES
;
;          000 THRU 127          RESERVED FOR DEC USE
;          128 THRU 255          RESERVED FOR CUSTOMER USE
;
;-

BT.SAB='B'1                      ;SYSTEM ACCOUNT BLOCK (SAB)
BT.UAB='B'2                      ;USER ACCOUNT BLOCK (UAB)
BT.TAB='B'3                      ;TASK ACCOUNT BLOCK (TAB)
BT.SS='B'11                      ;SYSLOG STARTUP TRANSACTION
BT.INV='B'12                     ;INVALID LOGIN TRANSACTION
BT.TIM='B'13                     ;SYSTEM TIME CHANGE TRANSACTION
BT.ALL='B'14                     ;ALLOCATE DEVICE TRANSACTION
BT.DEA='B'15                     ;DEALLOCATE DEVICE TRANSACTION
BT.MOU='B'16                     ;MOUNT DEVICE TRANSACTION
BT.DMO='B'17                     ;DISMOUNT DEVICE TRANSACTION
BT.PRT='B'20                     ;PRINT DESPOOLER TRANSACTION
BT.DIR='B'21                     ;DISK ACCOUNTING BY DIRECTORY
                                ; (UNSUPPORTED)
BT.VOL='B'22                     ;DISK ACCOUNTING BY VOLUME
                                ; (UNSUPPORTED)
BT.LOG='B'23                     ;LOGIN TRANSACTION
BT.CRH='B'24                     ;CRASH RECOVERY TRANSACTION
BT.DST='B'25                     ;DEVICE STATISTICS (UCB EXTENSION)
BT.RTP='B'26                     ;RESET TRANSACTION PARAMETERS
BT.INP='B'27                     ;CARD READER SPOOLING TRANSACTION

;+
;  STATUS MASK BIT DEFINITIONS (B.STM)
;-

```

ACNDF\$ (Cont.)

```

BS.ACT='B'200      ;CONTROL BLOCK ACTIVE
BS.CRH='B'100      ;RECORD FROM "TMP" FILE AFTER SYSTEM CRASH
BS.LGO='B'40       ;LOGGED OFF WITH OUTSTANDING ACTIVITY (UAB)
BS.CO='B'40        ;TASK'S TI: IS CO: (TAB ONLY)
BS.TML='B'20       ;TAB EXISTS ONLY FOR TIME LIMIT (TAB ONLY)
BS.SIL='B'20       ;SILENT LOGIN/LOGOUT (UAB ONLY)
BS.ZER='B'10       ;LAST CPU INTERVAL WAS OF LENGTH ZERO
BS.SCN='B'4        ;TRANSACTION READY FOR WRITE TO SCAN FILE

```

```

;+
; ACCOUNTING FEATURE MASK ($ACNFE)
;-

```

```

BF.DST='B'40000    ;STATISTICAL SCAN RATE
BF.WRT='B'2000     ;FORCE SYSLOG TO WRITE ITS BUFFER
BF.SCN='B'1000     ;SCAN REQUESTED
BF.SLR='B'400      ;SYSLOG IS RUNNING (NOT STOPPED)
BF.ERR='B'200      ;ACCOUNTING STOPPED DUE TO FATAL ERROR
BF.STR='B'100      ;ACCOUNTING IS STARTING UP / SHUTTING DOWN
BF.LSS='B'40       ;ACCUMULATE SYSTEM STATISTICS
                  ; (POINT UAB TO SAB)
BF.TRN='B'10       ;OUTPUT TO TRANSACTION FILE
BF.XTK='B'4        ;CHECKPOINT REQUEST IS DUE TO EXTK$
BF.TSK='B'2        ;TASK ACCOUNTING TURNED ON
BF.XAC='B'1        ;EXTENDED ACCOUNTING ASSEMBLED IN

```

```

;+
; SHUTDOWN CODES (B.SHDN)
;-

```

```

; 1      MAINTENANCE
; 2      REBOOT
; 3      SCHEDULED SHUTDOWN
; 4      ACCOUNTING SHUTDOWN BY TASK "SHUTUP"
; 5      OTHER

```

```

;*****
B.MAXL='B'128.     ;MAXIMUM TRANSACTION LENGTH
B.MINL='B'$SSHNLN   ;MINIMUM TRANSACTION LENGTH
;*****

```

```

.PSECT
.MACRO ACNDF$ X,Y
.ENDM
.ENDM

```

```

.MACRO ACTDF$,L,B
.ASECT

```

```

.=0
A.GRP:'L'          .BLKB 3      ; GROUP CODE (ASCII)
A.MBR:'L'          .BLKB 3      ; MEMBER CODE
A.PSWD:'L'         .BLKB 6      ; PASSWORD
A.LNM:'L'          .BLKB 14.    ; LAST NAME
A.FNM:'L'          .BLKB 12.    ; FIRST NAME
A.LDAT:'L'         .BLKB 6      ; DATE OF LAST LOGON
                        ; FORMAT = (DD/MM/YY HH:MM:SS)

```


ACNDFS\$ (Cont.)

```

A.NLOG:'L'      .BLKB  2      ; TOTAL NUMBER OF LOGONS
A.SYDV:'L'      .BLKB  4      ; DEFAULT SYSTEM DEVICE
A.ACN:'L'       .BLKW  1      ;ACCOUNT NUMBER (BINARY)
A.CLI:'L'       .BLKW  2      ; RAD50 USER CLI
                .BLKW  2      ; UNUSED
A.LPRV:'L'      .BLKW  1      ;LOGIN PRIVILEGE WORD
A.SID:'L'       .BLKW  1      ; SESSION IDENTIFIER
A.DDS:'L'       .BLKB  11.    ;DEFAULT DIRECTORY STRING
                .BLKB  1      ;UNUSED BYTE
A.FPRO:'L'      .BLKW  1      ;DEFAULT FILE PROTECTION
A.RLVL:'L'      .BLKW  1      ;ACCOUNT RECORD REV. LEVEL
AR.LVL='B'401
A.SALT:'L'      .BLKW  1      ;16-BIT ENCRYPTION SALT VALUE
A.ENCT:'L'      .BLKB  1      ;ENCRYPTION TYPE
                        0 = PLAIN TEXT OR ENCRYPT
                        1 = PURDY-V ALGORITHM
                        ;UNUSED
A.HPW:'L'       .BLKB  1      ;HASHED PASSWORD
                .BLKW  4
                .IF DF A$$LOG

A.TTY:'L'       .BLKB  5      ;TERMINAL TTNNN FOR AUTO LOGIN
A.PRID:'L'      .BLKB  1      ;PRIMARY DAYS MASK
A.SECD:'L'      .BLKB  1      ;SECONDARY DAYS MASK
A.PRIT:'L'      .BLKW  1      ;PRIMARY DAYS TIME
A.SECT:'L'      .BLKW  1      ;SECONDARY DAYS TIME
A.RLEN  ='B'    .
                .ENDC      ; DF A$$LOG

A.LEN  ='B'    128.          ;LENGTH OF CONTROL BLOCK
;
;
; BIT DEFINITIONS ON A.LPRV - LOGIN PRIVILEGE BITS
;
AL.SLV='B'      1            ;SLAVE TERMINAL ON LOGIN
AL.DDS='B'      2            ;INDICATOR FOR PROLOGUE 2 FORMAT
AL.SIL='B'      4            ;SILENT LOGIN/LOGOUT
                .IF DF A$$LOG

AL.AUT='B'      10           ;AUTO LOGIN ENABLED      ('*')
AL.BND='B'      20           ;BINDING ENABLED          ('Y')
AL.RMT='B'      40           ;REMOTE DIALUP 1=NO
AL.NET='B'      100          ;NETWORK LOGIN 1=NO
AL.DIS='B'      200          ;DISABLE THIS ACCOUNT FROM LOGIN
AL.PRI='B'      400          ;PRIMARY DAYS LIMIT SET
AL.SEC='B'      1000         ;SECONDARY DAYS LIMIT SET
                .ENDC      ; DF A$$LOG

;
                .PSECT
                .ENDM

```

CLKDFS

```

.MACRO CLKDFS,L,B

;+
; CLOCK QUEUE CONTROL BLOCK OFFSET DEFINITIONS
;
; CLOCK QUEUE CONTROL BLOCK
;
; THERE ARE FIVE TYPES OF CLOCK QUEUE CONTROL BLOCKS. EACH CONTROL BLOCK
; HAS THE SAME FORMAT IN THE FIRST FIVE WORDS AND DIFFERS IN THE REMAINING
; THREE. THE FOLLOWING CONTROL BLOCK TYPES ARE DEFINED:
;-

C.MRKT='B'0           ;MARK TIME REQUEST
C.SCHD='B'2           ;TASK REQUEST WITH PERIODIC RESCHEDULING
C.SSHT='B'4           ;SINGLE SHOT TASK REQUEST
C.SYST='B'6           ;SINGLE SHOT INTERNAL SYSTEM SUBROUTINE
                     ; (IDENT)
C.SYTK='B'8.          ;SINGLE SHOT INTERNAL SYSTEM SUBROUTINE
                     ; (TASK)
C.CSTP='B'10.         ;CLEAR STOP BIT (CONDITIONALIZED ON
                     ; SHUFFLING)

;
; CLOCK QUEUE CONTROL BLOCK TYPE INDEPENDENT OFFSET DEFINITIONS
;

.ASECT

.=0
C.LNK:'L' .BLKW 1      ;CLOCK QUEUE THREAD WORD
C.RQT:'L' .BLKB 1      ;REQUEST TYPE
C.EFN:'L' .BLKB 1      ;EVENT FLAG NUMBER (MARK TIME ONLY)
C.TCB:'L' .BLKW 1      ;TCB ADDRESS OR SYSTEM SUBROUTINE
                     ; IDENTIFICATION
C.TIM:'L' .BLKW 2      ;ABSOLUTE TIME WHEN REQUEST COMES DUE

;
; CLOCK QUEUE CONTROL BLOCK-MARK TIME DEPENDENT OFFSET DEFINITIONS
;

.=C.TIM+4              ;START OF DEPENDENT AREA
C.AST:'L' .BLKW 1      ;AST ADDRESS
C.SRC:'L' .BLKW 1      ;FLAG MASK WORD FOR 'BIS' SOURCE
C.DST:'L' .BLKW 1      ;ADDRESS OF 'BIS' DESTINATION
                     .BLKW 1      ;UNUSED

;
; CLOCK QUEUE CONTROL BLOCK-PERIODIC RESCHEDULING DEPENDENT OFFSET DEFINITIONS
;

.=C.TIM+4              ;START OF DEPENDENT AREA
C.RSI:'L' .BLKW 2      ;RESCHEDULE INTERVAL IN CLOCK TICKS
C.UIC:'L' .BLKW 1      ;SCHEDULING UIC
C.UAB:'L' .BLKW 1      ;POINTER TO ASSOCIATED UAB

;
; CLOCK QUEUE CONTROL BLOCK-SINGLE SHOT DEPENDENT OFFSET DEFINITIONS
;

```


CLKDFS\$ (Cont.)

```

.=C.TIM+4                                ;START OF DEPENDENT AREA
      .BLKW 2                            ;TWO UNUSED WORDS
      .BLKW 1                            ;SCHEDULING UIC
      .BLKW 1                            ;C.UAB

;
; CLOCK QUEUE CONTROL BLOCK-SINGLE SHOT INTERNAL SUBROUTINE OFFSET
;   DEFINITIONS
;
; THERE ARE TWO TYPE CODES FOR THIS TYPE OF REQUEST:'L'
;
;   TYPE 6=SINGLE SHOT INTERNAL SUBROUTINE WITH A 16 BIT VALUE AS AN
;   IDENTIFIER.
;   TYPE 8=SINGLE SHOT INTERNAL SUBROUTINE WITH A TCB ADDRESS AS AN
;   IDENTIFIER.
;
.=C.TIM+4                                ;START OF DEPENDENT AREA
C.SUB:'L' .BLKW 1                        ;SUBROUTINE ADDRESS
C.AR5:'L' .BLKW 1                        ;RELOCATION BASE (FOR LOADABLE DRIVERS)
C.URM:'L' .BLKW 1                        ;URM TO EXECUTE ROUTINE ON
      .BLKW 1                            ;(MP SYSTEMS, C.SYST ONLY)
      .BLKW 1                            ;UNUSED
C.LGTH='B'.                             ;LENGTH OF CLOCK QUEUE CONTROL BLOCK

;
;   NAMED DIRECTORY SUPPORT
;
; OFFSET C.EFN WILL BE REUSED IN SCHEDULING REQUESTS TO INDICATE IF C.UIC
; HAS A VALID UIC (C.NAM=0) OR IF C.UIC POINTS TO A CONTEXT BLOCK WITH A
; DDS. IN SCHEDULE REQUESTS, C.EFN WILL BE REFERRED TO AS C.NAM.
C.NAM='B'C.EFN                          ;FLAG WORD FOR USE WITH NAME DIRECTORIES
;
; DEPENDING ON THE VALUE IN C.NAM, C.UIC WILL CONTAIN A UIC OR A POINTER
; TO A CONTEXT BLOCK. C.UIC WILL BE REFERRED TO AS C.CTX WHEN IT CONTAINS
; A POINTER TO A CONTEXT BLOCK.
;
C.CTX='B'C.UIC                          ;POINTER TO CONTEXT BLOCK

      .PSECT

      .MACRO CLKDFS$ X,Y
      .ENDM
      .ENDM

```

CTBDF\$

```

.MACRO          CTBDF$

;
; CONTROLLER TABLE (CTB)
;
; THE CONTROLLER TABLE IS A CONTROL BLOCK THAT CONTAINS A
; VECTOR OF KRB ADDRESSES.  THIS VECTOR MAY BE ADDRESSED
; BY THE CONTROLLER INDEX TAKEN FROM THE INTERRUPT PS BY
; $INTSV/$INTSE.
;
;
      .ASECT
      .=177756
177756 L.CLK:  .BLKW  8.      ;START OF CLOCK BLOCK (IF ANY)
177776 L.ICB:  .BLKW  1      ;ICB CHAIN FOR THIS CTB
000000 L.LNK:  .BLKW  1      ;CTB LINK WORD
000002 L.NAM:  .BLKW  1      ;GENERIC CONTROLLER NAME (ASCII)
000004 L.DCB:  .BLKW  1      ;DCB ADDRESS OF THIS DEVICE
000006 L.NUM:  .BLKB  1      ;NUMBER OF KRB ADDRESSES IN TABLE
000007 L.STS:  .BLKB  1      ;CTB STATUS BYTE
000010 L.KRB:  .BLKW  1      ;START OF KRB ADDRESSES

;
; NOTE: THE SYMBOL $XYCTB:: IS DEFINED FOR EACH CTB,
; WHERE THE CHARACTERS XY ARE THE SAME AS THOSE STORED IN
; L.NAM.  THESYMBOL IS NOT THE START OF THE CTB, BUT THE
; START OFTHE KRB TABLE AT THE END OF THE CTB (L.KRB).
;
      .PSECT

;
; CONTROLLER TABLE STATUS BYTE BIT DEFINITIONS
;
LS.CLK=1          ;CLOCK BLOCK AT TOP OF CTB (1=YES)
LS.MDC=2          ;MULTIDRIVER CTB (1=YES)
LS.CBL=4          ;CLOCK BLK LINKED INTO CLK Q (1=YES)
LS.CIN=10         ;CONT. USE COMMON INT TABLE (1=YES)
LS.NET=20         ;THIS IS DECNET DEVICE.
                  ;ICB'S IN K.PRM
                  ;(1=YES)

;
; COMMON INTERRUPT TABLE DISPATCH ENTRY POINTS
;
CI.CSR=-6         ;CSR TEST ENTRY POINT
CI.KRB=-4         ;KRB STATUS CHANGE ENTRY POINT
CI.PWF=-2         ;POWERFAIL ENTRY POINT
CI.INT=0          ;COMMON INTERRUPT ADDRESS
CI.DCB=2          ;START OF DCB TABLE (0 ENDS TABLE)

```


DCBDF\$

```

        .MACRO  DCBDF$,L,B
;+
;
; DEVICE CONTROL BLOCK
;
; THE DEVICE CONTROL BLOCK (DCB) DEFINES GENERIC INFORMATION ABOUT A DEVICE
; TYPE AND THE LOWEST AND HIGHEST UNIT NUMBERS. THERE IS AT LEAST ONE DCB
; FOR EACH DEVICE TYPE IN A SYSTEM. FOR EXAMPLE, IF THERE ARE TELETYPES IN A
; SYSTEM, THEN THERE IS AT LEAST ONE DCB WITH THE DEVICE NAME 'TT'. IF PART
; OF THE TELETYPES WERE INTERFACED VIA DL11-A'S AND THE REST VIA A DH11, THEN
; THERE WOULD BE TWO DCB'S. ONE FOR ALL DL11-A INTERFACED TELETYPES, AND ONE
; FOR ALL DH11 INTERFACED TELETYPES.
;-

        .ASECT
.=0
D.LNK:'L' .BLKW 1          ;LINK TO NEXT DCB
D.UCB:'L' .BLKW 1          ;POINTER TO FIRST UNIT CONTROL BLOCK
D.NAM:'L' .BLKW 1          ;GENERIC DEVICE NAME
D.UNIT:'L' .BLKB 1         ;LOWEST UNIT NUMBER COVERED BY THIS DCB
                        .BLKB 1         ;HIGHEST UNIT NUMBER COVERED BY THIS DCB
D.UCBL:'L' .BLKW 1         ;LENGTH OF EACH UNIT CONTROL BLOCK IN BYTES
D.DSP:'L' .BLKW 1          ;POINTER TO DRIVER DISPATCH TABLE
D.MSK:'L' .BLKW 1          ;LEGAL FUNCTION MASK CODES 0-15.
                        .BLKW 1          ;CONTROL FUNCTION MASK CODES 0-15..
                        .BLKW 1          ;NOP'ED FUNCTION MASK CODES 0-15.
                        .BLKW 1          ;ACP FUNCTION MASK CODES 0-15.
                        .BLKW 1          ;LEGAL FUNCTION MASK CODES 16.-31.
                        .BLKW 1          ;CONTROL FUNCTION MASK CODES 16.-31.
                        .BLKW 1          ;NOP'ED FUNCTION MASK CODES 16.-31.
                        .BLKW 1          ;ACP FUNCTION MASK CODES 16.-31.
D.PCB:'L' .BLKW 1          ;LOADABLE DRIVER PCB ADDRESS

        .PSECT

;+
; DRIVER DISPATCH TABLE OFFSET DEFINITIONS
;-

D.VDEB='B'-2              ;DEALLOCATE BUFFER(S)
D.VCHK='B'-4              ;ADDRESS OF ROUTINE CALLED TO VALIDATE
                        ;AND CONVERT THE LBN. USED BY DRIVERS
                        ;THAT SUPPORT SEEK OPTIMIZATION.
D.VNXC='B'-4              ;ADDRESS OF ROUTINE IN TTDRV CALLED TO
                        ;HAVE IT SEND THE NEXT COMMAND IN THE
                        ;TYPEAHEAD BUFFER TO MCR...
D.VTOU='B'-10             ;ADDRESS OF ROUTINE IN TTDRV CALLED
                        ;FOR OUTPUT COMPLETION
D.VTIN='B'-6              ;ADDRESS OF ROUTINE IN TTDRV CALLED
                        ;FOR INPUT FROM THE CT FIRMWARE TASK
D.VINI='B'0              ;DEVICE INITIATOR
D.VCAN='B'2              ;CANCEL CURRENT I/O FUNCTION
D.VOUT='B'4              ;DEVICE TIMEOUT
D.VPWF='B'6              ;POWERFAIL RECOVERY
D.VKRB='B'10             ;CONTROLLER STATUS CHANGE ENTRY
D.VUCB='B'12             ;UNIT STATUS CHANGE ENTRY

```

DCBDF\$ (Cont.)

```
.IF NB SYSDEF
D.VINT='B'14                ;BEGINNING OF INTERRUPT DATA
.ENDC

.MACRO DCBDF$,X,Y,Z
.ENDM
.ENDM
```


C-17

EPKDF\$ (Cont.)

```

;
; Subpacket Flags for E$HSBF
;
SM.ERR  = 'B'      1 ; Error Packet
SM.HDR  = 'B'      1 ; Header Subpacket
SM.TSK  = 'B'      2 ; Task Subpacket
SM.DID  = 'B'      4 ; Device Identification Subpacket
SM.DOP  = 'B'     10 ; Device Operation Subpacket
SM.DAC  = 'B'     20 ; Device Activity Subpacket
SM.DAT  = 'B'     40 ; Data Subpacket
SM.MBC  = 'B'    20000 ; 22-bit massbus controller present
SM.CMD  = 'B'    40000 ; Error Log Command Packet
SM.ZER  = 'B'   100000 ; Zero I/O Counts

;
; Codes for field E$HIDN
;
EH$FOR  = 'B'      2 ; Current packet format

;
; Flags for the error log flags byte ($ERFLA) in the Executive
;
ES.INI  = 'B'      1 ; Error log initialized
ES.DAT  = 'B'      2 ; Error log receiving data packets
ES.LIM  = 'B'      4 ; Error limiting enabled
ES.LOG  = 'B'     10 ; Error logging enabled

;
; Type and Subtype Codes for fields E$HTYC and E$HTYS
;
; Symbols with names E$Cxxx are type codes for field E$HTYC,
; Symbols with names E$Sxxx are subtype codes for field E$HTYS.
;
E$CCMD  = 'B'      1 ; Error Log Control
E$SSTA  = 'B'      1 ; Error Log Status Change
E$SSWI  = 'B'      2 ; Switch Logging Files
E$SAPP  = 'B'      3 ; Append File
E$SBAC  = 'B'      4 ; Declare Backup File
E$SSHO  = 'B'      5 ; Show
E$SCHL  = 'B'      6 ; Change Limits
E$CERR  = 'B'      2 ; Device Errors
E$SDVH  = 'B'      1 ; Device Hard Error
E$SDVS  = 'B'      2 ; Device Soft Error
E$STMO  = 'B'      3 ; Device Interrupt Timeout (HARD)
E$SUNS  = 'B'      4 ; Device Unsolicited Interrupt
E$STMS  = 'B'      5 ; Device Interrupt Timeout (SOFT)

E$CDVI  = 'B'      3 ; Device Information
E$SDVI  = 'B'      1 ; Device Information Message

E$CDCI  = 'B'      4 ; Device Control Information
E$SMOU  = 'B'      1 ; Device Mount
E$SDMO  = 'B'      2 ; Device Dismount
E$SRRES = 'B'      3 ; Device Count Reset
E$SRCT  = 'B'      4 ; Block Replacement

E$CMEM  = 'B'      5 ; Memory Detected Errors
E$SMEM  = 'B'      1 ; Memory Error

```


EPKDF\$ (Cont.)

```

E$CSYS  ='B'          6 ; System Control Information
E$SPWR  ='B'          1 ;      Power Recovery

E$CCTL  ='B'          7 ; Control Information
E$STIM  ='B'          1 ;      Time Change
E$SCRS  ='B'          2 ;      System Crash
E$SLOA  ='B'          3 ;      Device Driver Load
E$SUNL  ='B'          4 ;      Device Driver Unload
E$SHRC  ='B'          5 ;      Reconfiguration Status Change
E$SMES  ='B'          6 ;      Message

E$CCPU  ='B'         10 ; CPU Detected Errors
E$SINT  ='B'          1 ;      Unexpected Interrupt
E$SINT  ='B'          2 ;      Unexpected Interrupt

```

```

;
; Subtype code 2 is reserved. Use 3 for the next following Subtype code

```

```

E$CSDE  ='B'         11 ; Software Detected Events
E$SABO  ='B'          1 ;      Task Abort

```

```

;
; Codes for Context Code entry E$HCTX
;

```

```

E$NOR   ='B'          1 ; Normal Entry
E$STA   ='B'          2 ; Start Entry
E$CRS   ='B'          3 ; Crash Entry

```

```

;
; Codes for Flags entry E$HFLG
;

```

```

E$VIR   ='B'          1 ; Addresses are virtual
E$EXT   ='B'          2 ; Addresses are extended
E$COU   ='B'          4 ; Error counts supplied
E$QBS   ='B'         10 ; Q-BUS CPU
E$LMR   ='B'         20 ; Limit reached

```

```

;
; Task Subpacket
;

```

```

+-----+
| Task Subpacket Length |
+-----+
| Task Name in RAD50    |
+-----+
| Task UIC               |
+-----+
| Task TI: Device Name   |
+-----+
| Flags                  | Task TI: Unit Number |
+-----+

```

```

.=0

```

EPKDF\$ (Cont.)

```

E$TLGH: 'L'      .BLKW  1      ; Task Subpacket Length
E$TTSK: 'L'      .BLKW  2      ; Task Name in RAD50
E$TUIC: 'L'      .BLKW  1      ; Task UIC
E$TTID: 'L'      .BLKB  2      ; Task TI: Device Name
E$TTIU: 'L'      .BLKB  1      ; Task TI: Unit
E$TFLG: 'L'      .BLKB  1      ; Flags
    
```

```

        .EVEN
E$TLEN: 'L'
    
```

```

;
; Flags for entry E$TFLG
;
    
```

```

        E$SPRV  = 'B'          1 ; Task is Privileged
        E$SPRI  = 'B'          2 ; Terminal is Privileged
    
```

```

;
; Device Identification Subpacket
;
    
```

Device Identification Subpacket Length	
Device Mnemonic Name	
Controller Number	Device Unit Number
Physical Subunit #	Physical Unit #
Physical Device Mnemonic (RSX-11M-PLUS only)	
Reserved	Flags
Volume Name of Mounted Volume	
Pack Identification	
Device Type Class	
Device Type	
I/O Operation Count Longword	
Hard Error Count	Soft Error Count
Blocks Transferred Count (RSX-11M-PLUS only)	
Cylinders Crossed Count (RSX-11M-PLUS only)	

EPKDFS (Cont.)

```

.=0

E$ILGH:'L'      .BLKW  1      ; Device Identification Subpacket Length
E$ILDV:'L'      .BLKW  1      ; Device Mnemonic Name
E$ILUN:'L'      .BLKB  1      ; Device Unit Number
E$IPCO:'L'      .BLKB  1      ; Controller Number
E$IPUN:'L'      .BLKB  1      ; Physical Unit Number
E$IPSU:'L'      .BLKB  1      ; Physical Subunit Number

                .IF DF R$$MPL

E$IPDV:'L'      .BLKW  1      ; Physical Device Mnemonic

                .ENDC ; R$$MPL

E$IFLG:'L'      .BLKB  1      ; Flags
                .BLKB  1      ; Reserved
E$IVOL:'L'      .BLKB  12.    ; Volume Name
E$IPAK:'L'      .BLKB  4      ; Pack Identification
E$IDEV:'L'      .BLKB  1      ; Device Type
E$IDCL:'L'      .BLKW  1      ; Device Type Class
E$IDTY:'L'      .BLKW  2      ; Device Type
E$IOPR:'L'      .BLKW  2      ; I/O Operation Count Longword
E$IERS:'L'      .BLKB  1      ; Soft Error Count
E$IERH:'L'      .BLKB  1      ; Hard Error Count

                .IF DF R$$MPL

E$IBLK:'L'      .BLKW  2      ; Blocks transferred count
E$ICYL:'L'      .BLKW  2      ; Cylinders crossed count

                .ENDC ; R$$MPL

                .EVEN

E$ILEN:'L'      ; Subpacket Length
;
; Flags for field E$IFLG
;
                EISUB  ='B'      1 ; Subcontroller device

                .IF DF R$$MPL

                EISNUX ='B'      2 ; No UCB extension, data invalid

                .ENDC ; R$$MPL

;
; Device Operation Subpacket
;
;
; +-----+
; | Device Operation Subpacket Length |
; +-----+
; | Task Name in RAD50 |
; |-----|
; | Task UIC |
; |-----|
; | Task TI: Logical Device Mnemonic |
; +-----+

```

(Continued on next page)

EPKDFS (Cont.)

```

;
; I/O Activity Subpacket Entry
;
;
; +-----+
; | Logical Device Name Mnemonic |
; +-----+
; | Controller Number | Logical Device Unit |
; +-----+
; | Physical Subunit # | Physical Unit Number |
; +-----+
; | Physical Device Mnemonic (RSX-11M-PLUS only) |
; +-----+
; | Task TI: logical unit | Device flags |
; +-----+
; | Requesting Task Name in RAD50 |
; +-----+
; | Requesting Task UIC |
; +-----+
; | Task TI: Logical Device Name |
; +-----+
; | I/O Function Code |
; +-----+
; | Reserved | Flags |
; +-----+
; | Transfer Operation Address |
; +-----+
; | Transfer Operation Byte Count |
; +-----+

```

```

.=0

```

```

E$ALDV: 'L'      .BLKW  1      ; Logical Device Name Mnemonic
E$ALUN: 'L'      .BLKB  1      ; Logical Device Unit
E$APCO: 'L'      .BLKB  1      ; Controller Number
E$APUN: 'L'      .BLKB  1      ; Physical Unit Number
E$APSU: 'L'      .BLKB  1      ; Physical Subunit Number

                .IF DF R$SMPL

E$APDV: 'L'      .BLKW  1      ; Physical Device Mnemonic

                .ENDC

E$ADFG: 'L'      .BLKB  1      ; Device flags
E$ATIU: 'L'      .BLKB  1      ; Task TI: Logical Unit
E$ATSK: 'L'      .BLKW  2      ; Requesting Task Name in RAD50
E$AUIC: 'L'      .BLKW  1      ; Requesting Task UIC
E$ATID: 'L'      .BLKW  1      ; Task TI: Logical Device Name
E$AFNC: 'L'      .BLKW  1      ; I/O Function Code
E$AFLG: 'L'      .BLKB  1      ; Flags
                .BLKB  1      ; Reserved
E$AADD: 'L'      .BLKW  2      ; Transfer Operation Address
E$ASIZ: 'L'      .BLKW  1      ; Transfer Operation Byte Count

```

```

.EVEN

```

EPKDFS (Cont.)

```

E$ALEN:'L'                                ; Subpacket Entry Length
;
; Flags for field E$ADFG
;
    EA$SUB  ='B'          1  ; Subcontroller device
        .IF DF R$$MPL
    EA$NUX  ='B'          2  ; No UCB extension, data invalid
        .ENDC ; R$$MPL
;
; Flags for field E$AFLG
;
    EA$TRA  ='B'          1  ; Transfer Operation
    EA$DMA  ='B'          2  ; DMA Device
    EA$EXT  ='B'          4  ; Device has Extended Addressing
    EA$PIP  ='B'         10  ; Device is positioning
    EA$IIO  ='B'         20  ; Internal I/O operation
    .PSECT
;
; FLAG DEFINITIONS FOR ERROR LOG FEATURE MASK
;
    EL.ICM  ='B'          1  ;SET - Inhibit Operator Console Messages
    EL.SEF  ='B'          2  ;SET - Special File Formats Enabled
    EL.MOU  ='B'          4  ;SET - Process MOU/DMO In Special Files

    .MACRO  EPKDFS  X,Y
    .ENDM

    .ENDM

```


EVNDF\$

```

.MACRO EVNDF$ L,B,LST

;
; EVNDF$ -- Event Packet Definitions
;
; This module contains a macro which defines the offsets and field
; values for TSA Event Packets (TEP's). These packets are used to
; pass data and status information between system components that
; provide Digital's Terminal Software Architecture support on RSX.
;+

;
; Explicit Inputs:
;
; L      ":" for global offset definitions
; B      "=" for global bit/value definitions
; LST    "LIST" for macro expansion listing
;
; Implicit Inputs:
;
; NONE
;
; Outputs:
;
; Symbols defined as described above.
; Listing as described above.
;-

;
; General packet header format
;
      .ASECT                                ; Define offsets absolutely
      .=0

E.VLNK:'L'      .BLKW  1      ; Link word
E.VSIZ:'L'      .BLKB  1      ; Packet size
E.VTYP:'L'      .BLKB  1      ; Packet type
E.VUCB:'L'      .BLKW  1      ; Terminal UCB address

;
; E.VTYP Values
;
ET.LOW='B'0      ; Lowest valid type code

ET.QIO='B'0      ; QIO (distinguishes QIO packet from TEP)
ET.BND='B'2      ; Bind Request
ET.UNB='B'4      ; Unbind Request
ET.BCP='B'6      ; Bind Complete
ET.REJ='B'10     ; Bind Reject
ET.DIS='B'12     ; Disconnect Notification
ET.DCP='B'14     ; Disconnect Complete
ET.ICS='B'16     ; Input Count State Change
ET.OOB='B'20     ; Out-of-Band (OOB)
ET.ONO='B'22     ; Abnormal Termination Request
ET.PHO='B'24     ; Physical Terminal Disconnected

ET.HI='B'24      ; Highest valid type code

```

EVNDFS\$ (Cont.)

```

;
;   The following definitions are for packet types that require
;   passing additional information in the packets. All other
;   packet types use the general packet format described above.
;

;
;   Bind Request packet (Terminal Management Mode --> Network)
;
;   . = E.VUCB+2

E.VBCT:'L'      .BLKW   1      ; Count of nodes (One for now)
E.VBND:'L'      .BLKB   6      ; Node name
E.VBLN:'L'      ; Length of bind request

;
;   Input Count State Change, Out-Of-Band packets (TTDRV --> Network)
;   And Modem Hang-up packets (TSA... --> Network)
;
;   . = E.VUCB+2

E.VAPR:'L'      .BLKW   1      ; Doubleword address of packet...
E.VADR:'L'      .BLKW   1      ; ...queueing routine
E.VFLG:'L'      .BLKW   1      ; Flag

;
;   Input Count State Change
;
;   . = E.VFLG+2

E.VSLN:'L'      ; Length of Input state message

;
;   OOB
;
;   . = E.VFLG+2

E.VOBM:'L'      .BLKW   6      ; Out-of-Band bitmasks
E.VHDR:'L'      .BLKW   2      ; Type-ahead buffer header
E.VTAB:'L'      .BLKB  10.     ; Type-ahead buffer
E.VOLN:'L'      ; Length of OOB packet

;
;   Terminal Management Switch Characters
;
;   . = E.VFLG+2

E.VSWC:'L'      .BLKW   1      ; Terminal management switch characters
E.VTLN:'L'      ; Length of Switch Character packet

;
;   Bit values in flag word (E.VFLG). For convenience some bits have
;   corresponding bits in the AST Control Block flag word (A.PRM+5).
;

```


EVNDFS\$ (Cont.)

```

EF.NCO='B'1           ; All non-control characters are out-of band
EF.NOI='B'2           ; All non-control OOB are include-OOB
EF.AST='B'10          ; Reserved bit synonymous with TF.AST
EF.LCK='B'40          ; Reserved bit synonymous with AF.LCK
EF.QUE='B'100         ; TEP is queued
EF.MDE='B'200         ; TEP is marked for delete

;
; Unbind Request packet (TMM --> Network)
;
      .=E.VUCB+2

E.VULN:'L'            ; Length of Unbind message

;
; Connect Reject notification packet (Network --> TMM)
;
      .=E.VUCB+2

E.VRR:'L'             .BLKW 1           ; Reason for Rejection
E.VRLN:'L'            ; Length of Reject message

;
; Disconnect Notification packet (Network --> TMM)
;
      .=E.VUCB+2

E.VRD:'L'             .BLKW 1           ; Reason for Disconnect
E.VDLN:'L'            ; Length of Disconnect message

;
; Disconnect Complete packet (TMM --> Network)
;
      .=E.VUCB+2

E.VDCL:'L'            ; Length of Disconnect Complete message

      .PSECT

      .IF NB LST
      .NLIST           ; Turn listing back off
      .IFF
      .MACRO EVNDFS$   ; If not listing, redefine
      .ENDM            ; macro to nothing
      .ENDC
      .ENDM EVNDFS$

```

F11DF\$

```

.MACRO F11DF$,L,B

;
; VOLUME CONTROL BLOCK
;

.ASECT

.=0

V.TRCT:'L'.BLKW 1 ; TRANSACTION COUNT
V.TYPE:'L'.BLKB 1 ; VOLUME TYPE DESCRIPTOR
    VT.FOR='B' 0 ; FOREIGN VOLUME STRUCTURE
    VT.SL1='B' 1 ; FILES-11 STRUCTURE LEVEL 1
    VT.SL2='B' 2 ; FILES-11 STRUCTURE LEVEL 2
    VT.ANS='B' 10 ; ANSI LABELED TAPE
    VT.UNL='B' 11 ; UNLABELED TAPE
V.VCHA:'L'.BLKB 1 ; VOLUME CHARACTERISTICS
    VC.SLK='B' 1 ; CLEAR VOLUME VALID ON DISMOUNT
    VC.HLK='B' 2 ; UNLOAD THE VOLUME ON DISMOUNT
    VC.DEA='B' 4 ; DEALLOCATE THE VOLUME ON DISMOUNT
    VC.PUB='B' 10 ; SET (CLEAR) US.PUB ON DISMOUNT
    VC.DUP='B' 20 ; DUPLICATE VOLUME NAME; DON'T DELETE LOGICALS
    VC.SIL='B' 40 ; SILENT MODE; SUPPRESS DISMOUNT COMPLETE MESSAGE
V.LABL:'L'.BLKB 14 ; VOLUME LABEL (ASCII)
V.PKSR:'L'.BLKW 2 ; PACK SERIAL NUMBER FOR ERROR LOGGING
V.SLEN:'L' ; LENGTH OF SHORT VCB
V.IFWI:'L'.BLKW 1 ; INDEX FILE WINDOW
V.FCB:'L'.BLKW 2 ; FILE CONTROL BLOCK LIST HEAD
V.IBLB:'L'.BLKB 1 ; INDEX BIT MAP 1ST LBN HIGH BYTE
V.IBSZ:'L'.BLKB 1 ; INDEX BIT MAP SIZE IN BLOCKS
    .BLKW 1 ; INDEX BITMAP 1ST LBN LOW BITS
V.FMAX:'L'.BLKW 1 ; MAX NO. OF FILES ON VOLUME
V.WISZ:'L'.BLKB 1 ; DEFAULT SIZE OF WINDOW IN RTRV PTRS
    ; VALUE IS < 128.
V.SBCL:'L'.BLKB 1 ; STORAGE BIT MAP CLUSTER FACTOR
V.SBSZ:'L'.BLKW 1 ; STORAGE BIT MAP SIZE IN BLOCKS
V.SBLB:'L'.BLKB 1 ; STORAGE BIT MAP 1ST LBN HIGH BYTE
V.FIEX:'L'.BLKB 1 ; DEFAULT FILE EXTEND SIZE
    .BLKW 1 ; STORAGE BIT MAP 1ST LBN LOW BITS

;
; WARNING
;
; THE FOLLOWING CELLS OF THE VCB ARE ORDER DEPENDENT.
; THEY ARE RETURNED BY A READ ATTRIBUTES FUNCTION AND
; MUST BE KEPT CONTIGUOUS. IF THE ORDER OF THE CELLS
; IS BROKEN, THE CODE MAY BREAK AS WELL.
;

V.VOWN:'L'.BLKW 1 ; VOLUME OWNER'S UIC
V.VPRO:'L'.BLKW 1 ; VOLUME PROTECTION
V.FPRO:'L'.BLKW 1 ; VOLUME DEFAULT FILE PROTECTION
V.FRBK:'L'.BLKB 1 ; NUMBER OF FREE BLOCKS ON VOLUME HIGH BYTE
V.LRUC:'L'.BLKB 1 ; COUNT OF AVAILABLE LRU SLOTS IN FCB LIST
    .BLKW 1 ; NUMBER OF FREE BLOCKS ON VOLUME LOW BITS

```


F11DF\$ (Cont.)

```

;
; WARNING
;
; THE ABOVE CELLS OF THE VCB ARE ORDER DEPENDENT.
; THEY ARE RETURNED BY A READ ATTRIBUTES FUNCTION AND
; MUST BE KEPT CONTIGUOUS. IF THE ORDER OF THE CELLS
; IS BROKEN, THE CODE MAY BREAK AS WELL.
;
;
V.STS: 'L'.BLKB 1 ; VOLUME STATUS BYTE, CONTAINING THE FOLLOWING
      VS.IFW= 'B' 1 ; INDEX FILE IS WRITE ACCESSED
      VS.BMW= 'B' 2 ; STORAGE BITMAP FILE IS WRITE ACCESSED
V.FFNU: 'L'.BLKB 1 ; FIRST FREE INDEX FILE BITMAP BLOCK
V.EXT: 'L'.BLKW 1 ; POINTER TO VCB EXTENSION
V.HBLB: 'L'.BLKW 2 ; LBN OF HOME BLOCK
V.HBCS: 'L'.BLKW 2 ; HOME BLOCK CHECKSUMS
V.LGTH: 'L' ; SIZE IN BYTES OF VCB

;
; MOUNT LIST ENTRY
;
; EACH ENTRY ALLOWS ACCESS TO A SPECIFIED USER FOR A NON-PUBLIC DEVICE
;
; TO ALLOW EXPANSION, ONLY THE ONLY TYPE CODE DEFINED IS "1" FOR
; DEVICE ACCESS BLOCKS
;

      .ASECT
.=0

M.LNK: 'L'.BLKW 1 ; LINK WORD
M.TYPE: 'L'.BLKB 1 ; TYPE OF ENTRY
      MT.MLS= 'B' 1 ; MOUNTED VOLUME USER ACCESS LIST
M.ACC: 'L'.BLKB 1 ; NUMBER OF ACCESSES
M.DEV: 'L'.BLKW 1 ; DEVICE UCB
M.TI: 'L'.BLKW 1 ; ACCESSOR TI: UCB
M.LEN: 'L' ; LENGTH OF ENTRY

;
; FILE CONTROL BLOCK
;

      .ASECT
.=0

F.LINK: 'L'.BLKW 1 ; FCB CHAIN POINTER
F.FNUM: 'L'.BLKW 1 ; FILE NUMBER
F.FSEQ: 'L'.BLKW 1 ; FILE SEQUENCE NUMBER
      .BLKB 1 ; NOT USED
F.FSQN: 'L'.BLKB 1 ; FILE SEGMENT NUMBER
F.FOWN: 'L'.BLKW 1 ; FILE OWNER'S UIC
F.FPRO: 'L'.BLKW 1 ; FILE PROTECTION CODE
F.UCHA: 'L'.BLKB 1 ; USER CONTROLLED CHARACTERISTICS
F.SCHA: 'L'.BLKB 1 ; SYSTEM CONTROLLED CHARACTERISTICS
F.HDLB: 'L'.BLKW 2 ; FILE HEADER LOGICAL BLOCK NUMBER

```

F11DF\$ (Cont.)

```

; BEGINNING OF STATISTICS BLOCK
F.LBN:'L'.BLKW 2 ; LBN OF VIRTUAL BLOCK 1 IF CONTIGUOUS
; 0 IF NON CONTIGUOUS
F.SIZE:'L'.BLKW 2 ; SIZE OF FILE IN BLOCKS
F.NACS:'L'.BLKB 1 ; NO. OF ACCESSES
F.NLCK:'L'.BLKB 1 ; NO. OF LOCKS
S.STBK='B'.-F.LBN ; SIZE OF STATISTICS BLOCK

F.STAT:'L' ; FCB STATUS WORD
F.NWAC:'L'.BLKB 1 ; NUMBER OF WRITE ACCESSORS
; STATUS BITS FOR FCB CONSISTING OF
; FC.WAC='B' 100000 ; SET IF FILE ACCESSED FOR WRITE
; FC.DIR='B' 40000 ; SET IF FCB IS IN DIRECTORY LRU
; FC.CEF='B' 20000 ; SET IF DIRECTORY EOF NEEDS UPDATING
; FC.FCO='B' 10000 ; SET IF TRYING TO FORCE DIRECTORY CONTIG
F.DREF:'L'.BLKW 1 ; DIRECTORY EOF BLOCK NUMBER
F.DRNM:'L'.BLKW 1 ; 1ST WORD OF DIRECTORY NAME
F.FEXT:'L'.BLKW 1 ; POINTER TO EXTENSION FCB
F.FVBN:'L'.BLKW 2 ; STARTING VBN OF THIS FILE SEGMENT
F.LKL:'L'.BLKW 1 ; POINTER TO LOCKED BLOCK LIST FOR FILE
F.WIN:'L'.BLKW 1 ; WINDOW BLOCK LIST FOR THIS FILE
F.LGTH:'L' ; SIZE IN BYTES OF FCB

;
; WINDOW
;

.ASECT
.=0

W.ACT:'L' ; NUMBER OF ACTIVE MAPPING POINTERS
; WHEN NO SECONDARY POOL
W.BLKS:'L' ; BLOCK SIZE OF SECONDARY POOL SEGMENT
; WHEN SECONDARY POOL
W.CTL:'L'.BLKW 1 ; LOW BYTE = # OF MAP ENTRIES ACTIVE
; HIGH BYTE CONSISTS OF CONTROL BITS
WI.RDV='B' 400 ; READ VIRTUAL BLOCK ALLOWED IF SET
WI.WRV='B' 1000 ; WRITE VIRTUAL BLOCK ALLOWED IF SET
WI.EXT='B' 2000 ; EXTEND ALLOWED IF SET
WI.LCK='B' 4000 ; SET IF LOCKED AGAINST SHARED ACCESS
WI.DLK='B' 10000 ; SET IF DEACCESS LOCK ENABLED
WI.PND='B' 20000 ; WINDOW TURN PENDING BIT
WI.EXL='B' 40000 ; SET IF MANUAL UNLOCK DESIRED
WI.WCK='B' 100000 ; DATA CHECK ALL WRITES TO FILE
W.IOC:'L'.BLKB 1 ; COUNT OF I/O THROUGH THIS WINDOW
; .BLKB 1 ; RESERVED
W.FCB:'L'.BLKW 1 ; FILE CONTROL BLOCK ADDRESS
W.TCB:'L'.BLKW 1 ; TCB ADDRESS OF ACCESSOR
W.UCB:'L'.BLKW 1 ; ORIGINAL UCB ADDRESS OF DEVICE
W.LKL:'L'.BLKW 1 ; POINTER TO LIST OF USERS LOCKED BLOCKS
W.WIN:'L'.BLKW 1 ; WINDOW BLOCK LIST LINK WORD

; IF NB,SYSDEF ; IF SYSDEF SPECIFIED IN CALL
; IF NDF,P$$WND ; IF SECONDARY POOL WINDOWS NOT ALLOWED

```


F11DF\$ (Cont.)

```

;
; NON-SECONDARY POOL WINDOW BLOCK
;
; IF SECONDARY POOL WINDOWS ARE NOT ENABLED, THE WINDOW BLOCK
; CONTAINS THE CONTROL INFORMATION AND RETRIEVAL POINTERS.
;

W.VBN:'L'.BLKB 1 ; HIGH BYTE OF 1ST VBN MAPPED BY WINDOW
W.MAP:'L' ; DEFINE LABEL WITH ODD ADDRESS TO CATCH BAD REFS
W.WISZ:'L'.BLKB 1 ; SIZE IN RTRV PTRS OF WINDOW (7 BITS)
; .BLKW 1 ; LOW ORDER WORD OF 1ST VBN MAPPED
W.RTRV:'L' ; OFFSET TO 1ST RETRIEVAL POINTER IN WINDOW

W.SLEN='B'-4 ; DUMMY DEFINITION TO PREVENT INCORRECT REFERENCE
; (-4 WHEN ROUNDED "UP" IS A VERY LARGE BLOCK)

.IFF ; IF WINDOWS IN SECONDARY POOL

;
; SECONDARY POOL WINDOW CONTROL AND MAPPING BLOCK
;
; IF SECONDARY POOL WINDOW BLOCKS ARE ENABLED, LUTN2 POINTS
; TO A CONTROL BLOCK IN SYSTEM POOL WHICH CONTAINS THE
; FOLLOWING CONTROL FIELDS AND THE MAPPING INFORMATION
; FOR THE SECONDARY POOL WINDOW.
;

W.MAP:'L'.BLKW 1 ; ADDR TO THE MAPPING PTRS IN SECONDARY POOL
W.SLEN:'L' ; LENGTH OF PRIMARY POOL STUB

;
; SECONDARY POOL WINDOW
; IF SECONDARY POOL WINDOW BLOCKS ARE ENABLED, THE RETRIEVAL
; POINTERS ARE MAINTAINED IN SECONDARY POOL IN THE FOLLOWING
; FORMAT.
;

.=0

ASSUME W.CTL,0

; .BLKB 1 ; NUMBER OF ACTIVE MAPPING POINTERS
W.USE:'L'.BLKB 1 ; STATUS OF BLOCK
W.VBN:'L'.BLKB 1 ; HIGH BYTE OF 1ST VBN MAPPED BY WINDOW
W.WISZ:'L'.BLKB 1 ; SIZE IN RTRV PTRS OF WINDOW (7 BITS)
; .BLKW 1 ; LOW ORDER WORD OF 1ST VBN MAPPED
W.RTRV:'L' ; OFFSET TO 1ST RETRIEVAL POINTER IN WINDOW

.ENDC ; END SECONDARY POOL WINDOW CONDITIONAL

.ENDC ; END SYSDEF CONDITIONAL

;
; LOCKED BLOCK LIST NODE
;

.ASECT

.=0

```

F11DF\$ (Cont.)

```
L.LNK:'L'.BLKW 1 ; LINK TO NEXT NODE IN LIST
L.WI1:'L'.BLKW 1 ; POINTER TO WINDOW FOR FIRST ENTRY
L.VB1:'L'.BLKB 1 ; HIGH ORDER VBN BYTE
L.CNT:'L'.BLKB 1 ; COUNT FOR ENTRY
               .BLKW 1 ; LOW ORDER VBN
L.LKSZ:'L'
```

; END OF DEFINITIONS

```
.PSECT
.MACRO F11DF$ X,Y,Z
.ENDM F11DF$
.ENDM F11DF$
```


HDRDFS

```

        .MACRO  HDRDFS,L,B

;+
; TASK HEADER OFFSET DEFINITIONS
;-

        .ASECT

.=0
H.CSP:'L'.BLKW 1      ;CURRENT STACK POINTER
H.HDLN:'L'.BLKW 1     ;HEADER LENGTH IN BYTES
H.SMAP:'L'.BLKB 1     ;SUPERVISOR D SPACE OVERMAP MASK
H.DMAP:'L'.BLKB 1     ;USER D SPACE OVERMAP MASK
H.FMAP:'L'.BLKW 1     ;POINTER TO FAST MAP SECTION OF HDR
H.CUIC:'L'.BLKW 1     ;CURRENT TASK UIC
H.DUIC:'L'.BLKW 1     ;DEFAULT TASK UIC
H.IPS:'L'.BLKW 1      ;INITIAL PROCESSOR STATUS WORD (PS)
H.IPC:'L'.BLKW 1      ;INITIAL PROGRAM COUNTER (PC)
H.ISP:'L'.BLKW 1      ;INITIAL STACK POINTER (SP)
H.ODVA:'L'.BLKW 1     ;ODT SST VECTOR ADDRESS
H.ODVL:'L'.BLKW 1     ;ODT SST VECTOR LENGTH
H.TKVA:'L'.BLKW 1     ;TASK SST VECTOR ADDRESS
H.TKVL:'L'.BLKW 1     ;TASK SST VECTOR LENGTH
H.PFVA:'L'.BLKW 1     ;POWER FAIL AST CONTROL BLOCK ADDRESS
H.FPVA:'L'.BLKW 1     ;FLOATING POINT AST CONTROL BLOCK ADDRESS
H.RCVA:'L'.BLKW 1     ;RECIEVE AST CONTROL BLOCK ADDRESS
H.EFSV:'L'.BLKW 1     ;EVENT FLAG ADDRESS SAVE ADDRESS
H.FPSA:'L'.BLKW 1     ;POINTER TO FLOATING POINT/EAE SAVE AREA
H.WND:'L'.BLKW 1      ;POINTER TO NUMBER OF WINDOW BLOCKS
H.DSW:'L'.BLKW 1      ;TASK DIRECTIVE STATUS WORD
H.FCS:'L'.BLKW 1      ;FCS IMPURE POINTER
H.FORT:'L'.BLKW 1     ;FORTRAN IMPURE POINTER
H.OVLY:'L'.BLKW 1     ;OVERLAY IMPURE POINTER
H.VEXT:'L'.BLKW 1     ;WORK AREA EXTENSION VECTOR POINTER
H.SPRI:'L'.BLKB 1     ;PRIORITY DIFFERENCE FOR SWAPPING
H.NML:'L'.BLKB 1      ;NETWORK MAILBOX LUN
H.RRVA:'L'.BLKW 1     ;RECEIVE BY REFERENCE AST CONTROL BLOCK
                        ; ADDRESS
H.X25:'L'.BLKB 1      ;FOR USE BY X25 SOFTWARE
                        .BLKB 1      ;5 RESERVED BYTES
                        .BLKW 2
H.GARD:'L'.BLKW 1     ;POINTER TO HEADER GUARD WORD
H.NLUN:'L'.BLKW 1     ;NUMBER OF LUN'S
H.LUN:'L'.BLKW 2      ;START OF LOGICAL UNIT TABLE

;+
; LENGTH OF FLOATING POINT SAVE AREA
;-

H.FPSL='B'25.*2      ;

;+
; WINDOW BLOCK OFFSETS
;-

.=0
W.BPCB:'L'.BLKW 1     ;PARTITION CONTROL BLOCK ADDRESS
W.BLVR:'L'.BLKW 1     ;LOW VIRTUAL ADDRESS LIMIT
W.BHVR:'L'.BLKW 1     ;HIGH VIRTUAL ADDRESS LIMIT
W.BATT:'L'.BLKW 1     ;ADDRESS OF ATTACHMENT DESCRIPTOR
W.BSIZ:'L'.BLKW 1     ;SIZE OF WINDOW IN 32W BLOCKS

```

HDRDF\$ (Cont.)

W.BoFF:'L'.BLKW 1
W.BFPD:'L'.BLKB 1
W.BNPD:'L'.BLKB 1
W.BLPD:'L'.BLKW 1
W.BLGH:'L'

;PHYSICAL MEMORY OFFSET IN 32W BLOCKS
;FIRST PDR ADDRESS
;NUMBER OF PDR'S TO MAP
;CONTENTS OF LAST PDR
;LENGTH OF WINDOW DESCRIPTOR

;
; BIT DEFINITION FOR W.BLPD
;

WB.NBP='B'20
WB.BPS='B'40

;CACHE BYPASS NOT DESIRED FOR THIS WINDOW
;ALWAYS BYPASS THE CACHE FOR THIS WINDOW

.PSECT

.MACRO HDRDF\$ X,Y
.ENDM
.ENDM

HWDDF\$

```

        .MACRO HWDDF$,L,B

;+
; MACROS FOR DEFINING MAPPING REGISTER DEFINITIONS
;-

        .MACRO CRESET  NAM,ADDR
$$$=0
        .REPT      8.
        CRENAM     NAM,ADDR+<$$$2>,$$$
$$$=$$$+1
        .ENDR
        .ENDM

        .MACRO CRENAM  NAM,ADDR,N
'NAM' 'N'==ADDR
        .ENDM

;+
; HARDWARE REGISTER ADDRESSES AND STATUS CODES
;-

MPCSR='B'177746          ;ADDRESS OF PDP-11/70 MEMORY PARITY
                          ; REGISTER
MPAR='B'172100           ;ADDRESS OF FIRST MEMORY PARITY REGISTER
PIRQ='B'177772           ;PROGRAMMED INTERRUPT REQUEST REGISTER
PR0='B'0                 ;PROCESSOR PRIORITY 0
PR1='B'40                ;PROCESSOR PRIORITY 1
PR4='B'200               ;PROCESSOR PRIORITY 4
PR5='B'240               ;PROCESSOR PRIORITY 5
PR6='B'300               ;PROCESSOR PRIORITY 6
PR7='B'340               ;PROCESSOR PRIORITY 7
PS='B'177776             ;PROCESSOR STATUS WORD
SWR='B'177570            ;CONSOLE SWITCH AND DISPLAY REGISTER
TPS='B'177564            ;CONSOLE TERMINAL PRINTER STATUS REGISTER

;+
; EXTENDED ARITHMETIC ELEMENT REGISTERS
;-

        .IF DF  E$$EAE

AC='B'177302             ;ACCUMULATOR
MQ='B'177304             ;MULTIPLIER-QUOTIENT
SC='B'177310             ;SHIFT COUNT

        .ENDC

;+
; MEMORY MANAGEMENT HARDWARE REGISTERS AND STATUS CODES
;-

        .IF NB  B

        CRESET  KINAR,172340 ;KERNEL I PAR'S
        CRESET  KINDR,172300 ;KERNEL I PDR'S
        CRESET  KDSAR,172360 ;KERNEL D PAR'S
        CRESET  KDSDR,172320 ;KERNEL D PDR'S

```

HWDDF\$ (Cont.)

```

CRESET  SISAR,172240      ;SUPERVISOR I PAR'S
CRESET  SISDR,172200      ;SUPERVISOR I PDR'S
CRESET  SDSAR,172260      ;SUPERVISOR D PAR'S
CRESET  SDSDR,172220      ;SUPERVISOR D PDR'S
CRESET  UINAR,177640      ;USER I PAR'S
CRESET  UINDR,177600      ;USER I PDR'S
CRESET  UDSAR,177660      ;USER D PAR'S
CRESET  UDSDR,177620      ;USER D PDR'S

.ENDC

.IF NB  SYSDEF

.IF DF  K$$DAS

CRESET  KISAR,172360      ;KERNEL D PAR'S
CRESET  KISDR,172320      ;KERNEL D PDR'S

.IFF

CRESET  KISAR,172340      ;KERNEL I PAR'S
CRESET  KISDR,172300      ;KERNEL I PDR'S

.ENDC

.IF DF  U$$DAS

CRESET  UISAR,177660      ;USER D PAR'S
CRESET  UISDR,177620      ;USER D PDR'S

.IFF      ; DF U$$DAS

CRESET  UISAR,177640      ;USER I PAR'S
CRESET  UISDR,177600      ;USER I PDR'S

.ENDC      ; DF U$$DAS
.ENDC

UBMPR='B'170200          ;UNIBUS MAPPING REGISTER 0
CMODE='B'140000          ;CURRENT MODE FIELD OF PS WORD
PMODE='B'30000           ;PREVIOUS MODE FIELD OF PS WORD
CSMODE='B'40000          ;CURRENT MODE = SUPERVISOR PS WORD BITS
PSMODE='B'10000          ;PREVIOUS MODE = SUPERVISOR PS WORD BITS
SR0='B'177572            ;SEGMENT STATUS REGISTER 0
SR3='B'172516            ;SEGMENT STATUS REGISTER 3
CPUERR='B'177766         ;CPU ERROR REGISTER
MEMERR='B'177744         ;MEMORY SYSTEM ERROR REGISTER
MEMCTL='B'177746         ;MEMORY CONTROL REGISTER

;+
; DEFINE THE LOCATIONS USED IN THE NON-VOLATILE RAM (NVR)
; FOR XT SYSTEMS
;-

N.KEY='B'173054          ;NUMBER OF KEYS PRESSED
N.UPT='B'173064          ;UPTIME IN MINUTES
N.DZA='B'173074          ;NUMBER OF I/OS DONE ON THE DZ
N.DWA='B'173104          ;NUMBER OF I/OS DONE ON THE DW
N.DAY='B'173114          ;DATE THAT THE NVR WAS LAST INITIALIZED
N.MON='B'173116          ;...
N.YEA='B'173120          ;...

```


HWDDF\$ (Cont.)

```
;+
; FEATURE SYMBOL DEFINITIONS
;-
```

```
FE.EXT='B'1          ;22-BIT EXTENDED MEMORY SUPPORT
FE.MUP='B'2          ;MULTI-USER PROTECTION SUPPORT
FE.EXV='B'4          ;EXECUTIVE IS SUPPORTED TO 20K
FE.DRV='B'10         ;LOADABLE DRIVER SUPPORT
FE.PLA='B'20         ;PLAS SUPPORT
FE.CAL='B'40         ;DYNAMIC CHECKPOINT SPACE ALLOCATION
FE.PKT='B'100        ;PREALLOCATION OF I/O PACKETS
FE.EXP='B'200        ;EXTEND TASK DIRECTIVE SUPPORTED
FE.LSI='B'400        ;PROCESSOR IS AN LSI-11
FE.OFF='B'1000       ;PARENT/OFFSPRING TASKING SUPPORTED
FE.FDT='B'2000       ;FULL DUPLEX TERMINAL DRIVER SUPPORTED
FE.X25='B'4000       ;X.25 CEX IS LOADED
FE.DYM='B'10000      ;DYNAMIC MEMORY ALLOCATION SUPPORTED
FE.CEX='B'20000      ;COM EXEC IS LOADED
FE.MXT='B'40000      ;MCR EXIT AFTER EACH COMMAND MODE
FE.NLG='B'100000     ;LOGINS DISABLED - MULTI-USER SUPPORT
```

```
;+
; FEATURE MASK DEFINITIONS (SECOND WORD)
;-
```

```
F2.DAS='B'1          ;KERNEL DATA SPACE SUPPORTED
F2.LIB='B'2          ;SUPERVISOR MODE LIBRARIES SUPPORTED
F2.MP='B'4           ;SYSTEM SUPPORTS MULTIPROCESSING
F2.EVT='B'10         ;SYSTEM SUPPORTS EVENT TRACE FEATURE
F2.ACN='B'20         ;SYSTEM SUPPORTS CPU ACCOUNTING
F2.SDW='B'40         ;SYSTEM SUPPORTS SHADOW RECORDING
F2.POL='B'100        ;SYSTEM SUPPORTS SECONDARY POOLS
F2.WND='B'200        ;SYSTEM SUPPORTS SECONDARY POOL FILE WINDOWS
F2.DPR='B'400        ;SYSTEM HAS A SEPARATE DIRECTIVE PARTITION
F2.IRR='B'1000       ;INSTALL, RUN, AND REMOVE SUPPORT
F2.GGF='B'2000       ;GROUP GLOBAL EVENT FLAG SUPPORT
F2.RAS='B'4000       ;RECEIVE/SEND DATA PACKET SUPPORT
F2.AHR='B'10000      ;ALT. HEADER REFRESH AREA SUPPORT
F2.RBN='B'20000      ;ROUND ROBIN SCHEDULING SUPPORT
F2.SWP='B'40000      ;EXECUTIVE LEVEL DISK SWAPPING SUPPORT
F2.STP='B'100000     ;EVENT FLAG MASK IS IN THE TCB (1=YES)
```

```
;+
; THIRD FEATURE MASK SYMBOL DEFINITIONS
;-
```

```
F3.CRA='B'1          ;SYSTEM SPONTANEOUSLY CRASHED (1=YES)
F3.XCR='B'2          ;SYSTEM CRASHED FROM XDT (1=YES)
F3.EIS='B'4          ;SYSTEM REQUIRES EXTENDED INSTRUCTION SET
F3.STM='B'10         ;SYSTEM HAS SET SYSTEM TIME DIRECTIVE
F3.UDS='B'20         ;SYSTEM SUPPORTS USER DATA SPACE
F3.PRO='B'40         ;SYSTEM SUPPORTS SEC. POOL PROTO TCBS
F3.XHR='B'100        ;SYSTEM SUPPORTS EXTERNAL TASK HEADERS
F3.AST='B'200        ;SYSTEM HAS AST SUPPORT
F3.11S='B'400        ;RSX-11S SYSTEM
F3.CLI='B'1000       ;MULTIPLE CLI SUPPORT
F3.TCM='B'2000       ;SYSTEM HAS SEPARATE TERMINAL DRIVER POOL
F3.PMN='B'4000       ;SYSTEM SUPPORTS POOL MONITORING
F3.WAT='B'10000      ;SYSTEM HAS WATCHDOG TIMER SUPPORT
F3.RLK='B'20000      ;SYSTEM SUPPORTS RMS RECORD LOCKING
F3.SHF='B'40000      ;SYSTEM SUPPORTS SHUFFLER TASK
```

HWDDF\$ (Cont.)

```
;+
; FOURTH FEATURE MASK BITS
;-
```

```
F4.CXD='B'1      ;COMM EXEC IS DEALLOCATED (NON-I/D ONLY)
F4.XT='B'2        ;SYSTEM IS AN XT SYSTEM (1=YES)
F4.ERL='B'4       ;SYSTEM SUPPORTS ERROR LOGGING (1=YES)
F4.PTY='B'10      ;SYSTEM SUPPORTS PARITY MEMORY (1=YES)
F4.DVN='B'20      ;SYSTEM SUPPORTS DECIMAL VERSIONS (1=YES)
F4.LCD='B'40      ;SYSTEM SUPPORTS LOADABLE CRASH (1=YES)
F4.NIM='B'100     ;SYSTEM SUPPORTS DELETED TASK IMAGES (1=YES)
F4.CHE='B'200     ;SYSTEM SUPPORTS DISK DATA CACHING (1=YES)
F4.LOG='B'400     ;SYSTEM SUPPORTS LOGICAL NAMES (1=YES)
F4.NAM='B'1000    ;SYSTEM SUPPORTS NAMED DIRECTORIES (1=YES)
F4.FMP='B'2000    ;SYSTEM SUPPORTS FAST MAP DIRECTIVE
F4.DCL='B'4000    ;DCL IS DEFAULT CLI (1=YES)
F4.DDS='B'10000   ;NAMED DIRECTORY MODE IS THE DEFAULT (1=YES)
F4.ACD='B'20000   ;SYSTEM SUPPORTS ACD'S
```

```
;+
; HARDWARE FEATURE MASK BIT DEFINITIONS
;
; HF.CIS,HF.FPP DEFINED AS SIGN BITS FOR RUN TIME SPEED
;-
```

```
HF.UBM='B'1      ;PROCESSOR HAS A UNIBUS MAP (1=YES)
HF.EIS='B'2      ;PROCESSOR HAS EXTENDED INSTRUCTION SET
HF.QB='B'4       ;SYSTEM HAS A QBUS (1=YES)
HF.DSP='B'10     ;HARDWARE SUPPORTS DATA SPACE
HF.CIS='B'200    ;PROCESSOR SUPPORTS COMMERCIAL INSTRUCTION SET
HF.FPP='B'100000 ;(1=PROC. HAS NO FLOATING POINT UNIT)
```

```
;+
; SECOND HARDWARE FEATURE MASK BIT DEFINITIONS
; THIS WORD IS RESERVED FOR XT HARDWARE FEATURES
;-
```

```
H2.NVR='B'1      ;XT NON-VOLATILE RAM PRESENT (1=YES)
H2.INV='B'2      ;NON-VOLATILE RAM IS INVALID (1=YES)
H2.CLK='B'4      ;XT CLOCK IS PRESENT (1=YES)
H2.ITF='B'10     ;INVALID TIME FORMAT IN NON-VOLATILE RAM
                ; (1=YES)
H2.PRO='B'20     ;RUNNING ON PRO/3XX HARDWARE
H2.BRG='B'100000 ;XT BRIDGE MODULE PRESENT (1=YES)
```

```
;+
; SYSGEN FEATURE SELECTIONS MASK. THIS IS INTENDED TO RECORD IN A
; BIT MASK THE CHOICES MADE AT SYSGEN TIME. FEATURES ARE LISTED HERE FOR
; OUR INFORMATIONAL PURPOSES ONLY. THEY CANNOT BE TESTED LIKE BITS IN THE
; FEATURE MASK SINCE THIS ONLY EXISTS IN THE RSX11M.STB FILE. NO BITS IN
; MEMORY ; ARE USED. THEY ARE ONLY INTENDED TO BE PRINTED FROM THE STB FILE
; BY CDA.
;-
```

```
SF.STD='B'1      ;STANDARD EXEC SELECTED
SF.PGN='B'2      ;SYSTEM WAS PRE-GENERATED
                ; (EX. RL02/RC25 SYSTEM)
```


HWDDF\$ (Cont.)

```

;+
; MULTIPROCESSOR STATUS TABLE DEFINITIONS (TEMPORARY)
;-

MP.CRH='B'100000          ;CRASH PROCESSOR IMMEDIATELY
MP.PWF='B'40000           ;POWERFAIL ON ONE CPU
MP.RSM='B'20000           ;RESET INTERRUPT MASKS
MP.NOP='B'10000           ;NOP FUNCTION FOR TRANSMISSION CHECK
MP.STP='B'4               ;STOP PROCESSOR IN ORDERLY FASHION
MP.INT='B'7777            ;BIC MASK FOR INTERRUPT LVL FUNCTIONS

      .MACRO  HWDDF$  X,Y,Z
      .ENDM
      .ENDM

```

ITBDF\$

```

.MACRO ITBDF$ L,B

;
; INTERRUPT TRANSFER BLOCK (ITB) OFFSET DEFINITIONS
;

    .IF DF A$$TRP

    .MCALL PKTDF$
    PKTDF$
    ; DEFINE AST BLOCK OFFSETS

    .ENDC

    .ASECT
    .=0
X.LNK:'L' .BLKW 1 ; LINK WORD FOR ITB LIST STARTING IN TCB
X.JSR:'L' JSR R5,@ 0 ; CALL $INTSC
X.PSW:'L' .BLKB 1 ; LOW BYTE OF PSW FOR ISR
    .BLKB 1 ; UNUSED
X.ISR:'L' .BLKW 1 ; ISR ENTRY POINT (APR5 MAPPING)
X.FORK:'L' ; FORK BLOCK
    .BLKW 1 ; THREAD WORD
    .BLKW 1 ; FORK PC
    .BLKW 1 ; SAVED R5
    .BLKW 1 ; SAVED R4

    .IF DF M$$MGE

X.REL:'L' .BLKW 1 ; RELOCATION BASE FOR APR5

    .ENDC

X.DSI:'L' .BLKW 1 ; ADDRESS OF DIS.INT. ROUTINE
X.TCB:'L' .BLKW 1 ; TCB ADDRESS OF OWNING TASK

    .IF NB SYSDEF

    .IF DF A$$TRP

    .BLKW 1 ; A.DQSR FOR AST BLOCK
X.AST:'L' .BLKB A.PRM ; AST BLOCK

    .ENDC

X.VEC:'L' .BLKW 1 ; VECTOR ADDRESS (IF AST SUPPORT,
; THIS IS FIRST AND ONLY AST PARAMETER)
X.VPC:'L' .BLKW 1 ; SAVED VECTOR PC
X.LEN:'L' ; LENGTH IN BYTES OF ITB

    .ENDC

    .PSECT

    .MACRO ITBDF$ X,Y,Z

    .ENDM ITBDF$

```


KRBDF\$

```

; .MACRO      KRBDF$

;
; CONTROLLER REQUEST BLOCK (KRB)
;
; THE CONTROLLER REQUEST BLOCK DEFINES THE ENVIRONMENT OF A DEVICE
; CONTROLLER.  EXACTLY ONE KRB EXISTS FOR EVERY DEVICE CONTROLLER
; IN AN RSX-11M+ SYSTEM.  THE KRB CONTAINS CERTAIN DEVICE STATUS
; INCLUDING THE CSR AND VECTOR ADDRESS FOR THE CONTROLLER.
;
      .ASECT
      .=177770
177770 K.PRM: .BLKW 1      ;DEVICE DEPENDANT PARAMETER WORD
177772 K.PRI: .BLKB 1      ;CONTROLLER PRIORITY
177773 K.VCT: .BLKB 1      ;INTERRUPT VECTOR ADDRESS
177774 K.CON: .BLKB 1      ;CONTROLLER INDEX WITHIN THE SYSTEM
177775 K.IOC: .BLKB 1      ;CONTROLLER I/O COUNT
177776 K.STS: .BLKW 1      ;CONTROLLER STATUS
000000 K.CSR: .BLKW 1      ;ADDRESS OF CONTROL STATUS REGISTER
;
; NOTE: K.CSR MUST BE THE ZERO OFFSET!
;
000002 K.OFF: .BLKW 1      ;OFFSET TO UCB/UMR/RHBAE TABLE
000004 K.HPU: .BLKB 1      ;HIGHEST PHYSICAL UNIT NUMBER
000005      .BLKB 1      ;UNUSED BYTE
000006 K.OWN: .BLKW 1      ;OWNER OF CONTROLLER
000010 K.CRQ: .BLKW 2      ;CONTROLLER REQUEST QUEUE
000014 K.URM: .BLKW 1      ;CONTROLLER UNIBUS RUN MASK
000016 K.FRK: .BLKW 1      ;POSSIBLE KRB FORK BLOCK
;
; OFFSETS FOR THE KRB EXTENSION REACHED BY ADDING (K.OFF) TO
; THE STARTING ADDRESS OF THE KRB.
;

;
; DEFINE OFFSETS IN SCB/KRB FOR DISK MSCP CONTROLLERS
;
      .=-20.
177754 KE.UMH: .BLKW 2      ;LIST HEAD FOR UMR WAITING ASSIGNMENT
                        ;BLK(S)
177760 KE.UMC: .BLKW 1      ;COUNT OF AVAILABLE UMR WAITING
                        ;ASSIGNMENT BLOCK(S)
      .=177776
177776 KE.RHB: .BLKW 1      ;OFFSET TO RHBAE REGISTER (IF ANY)
;
; WHEN ONE ADDS (K.OFF) TO THE KRB ADDRESS, IT YIELDS AN
; ADDRESS WHICH POINTS TO HERE.
;
000000 KE.UCB: .BLKW 1      ;OFFSET TO UCB TABLE (IF KS.UCB SET)
      .PSECT

```

KRBDF\$ (Cont.)

```

; CONTROLLER REQUEST BLOCK (KRB) STATUS BIT DEFINITIONS
;
KS.OFL=1           ;CONTROLLER OFFLINE (1=YES)
KS.MOF=2           ;CONTROLLER MARKED FOR OFFLINE (1=YES)
KS.UOP=4           ;SUPPORTS OVERLAPPED OPERATION (1=YES)
KS.MBC=10          ;DEVICE IS MASSBUS CONTROLLER (1=YES)
KS.SDX=20          ;SEEKS ALLOWED DURING DATA XFERS (1=YES)
KS.POE=40          ;PARALLEL OPERATION ENABLED (1=YES)
KS.UCB=100         ;UCB TABLE PRESENT (1=YES)
KS.DIP=200         ;DATA TRANSFER IN PROGRESS (1=YES)
KS.PDF=400         ;PRIVILEGED DIAGNOSTIC FUNCTIONS ONLY
                   ;BLOCK(S) (1=YES)
KS.EXT=1000        ;EXTENDED 22-BIT UNIBUS CONTROLLER
                   ;BLOCK(S); (1=YES)
KS.SLO=2000        ;CONTROLLER IS SLOW COMING ONLINE
                   ;BLOCK(S) (1=YES)

;
; DEFINE THE CONTIGUOUS SCB OFFSETS
;
      .ASECT
      .=-177762
177762 S.PRI:  .BLKB  1      ;CONTROLLER PRIORITY
177763 S.VCT:  .BLKB  1      ;INTERRUPT VECTOR ADDRESS
177764 S.CON:  .BLKB  1      ;CONTROLLER INDEX
177765      .BLKB  1
177766      .BLKW  1
177770 S.CSR:  .BLKW  1      ;CONTROL AND STATUS REGISTER
177772      .BLKW  1
177774      .BLKB  1
177775      .BLKB  1
177776 S.OWN:  .BLKW  1      ;DISTRIBUTED CNTBL

;
; SUBCONTROLLER REQUEST BLOCK (KRB1)
;
; THE SUBCONTROLLER REQUEST BLOCK DEFINES THE ENVIRONMENT OF A
; DEVICE SUBCONTROLLER. EXACTLY ONE KRB1 EXISTS FOR EVERY DEVICE
; SUBCONTROLLER IN AN RSX-11M+ SYSTEM.
;
      .ASECT
      .=-4
177774 K1.CON: .BLKB  1      ;SUBCONTROLLER INDEX WITHIN THE SYSTEM
177775      .BLKB  1      ;UNUSED BYTE
177776 K1.STS: .BLKW  1      ;SUBCONTROLLER STATUS
000000 K1.MAS: .BLKW  1      ;UCB ADDRESS OF THE MASTER UNIT
;
; NOTE: K1.MAS MUST BE THE ZERO OFFSET
;
000002 K1.OWN: .BLKW  1      ;OWNER OF SUBCONTROLLER
000004 K1.CRQ: .BLKW  2      ;SUBCONTROLLER REQUEST QUEUE
000010 K1.UCB:      ;START OF THE UCB TABLE (IF ANY)

      .PSECT

```


LCBDFS

```

; .MACRO          LCBDFS

;
; LOGICAL ASSIGNMENT CONTROL BLOCK
;
; THE LOGICAL ASSIGNMENT CONTROL BLOCK (LCB) IS USED TO
; ASSOCIATE A LOGICAL NAME WITH A PHYSICAL DEVICE UNIT.
; LOGICAL CONTROL BLOCKS ARE LINKED TO FORM THE LOGICAL
; ASSIGNMENTS OF A SYSTEM. LOGICAL ASSIGNMENTS CAN BE MADE
; ON A SYSTEM-WIDE OR LOCAL (TERMINAL) BASIS.
;
      .ASECT
      . = 0
000000 L.LNK:  .BLKW  1      ;LINK TO NEXT LCB
000002 L.NAM:  .BLKW  1      ;LOGICAL NAME OF DEVICE
000004 L.UNIT: .BLKB  1      ;LOGICAL UNIT NUMBER
000005 L.TYPE: .BLKB  1      ;TYPE OF ENTRY (0=SYSTEM WIDE)
000006 L.UCB:  .BLKW  1      ;TI UCB ADDRESS
000010 L.ASG:  .BLKW  1      ;ASSIGNMENT UCB ADDRESS
000012 L.LGTH=. -L.LNK      ;LENGTH OF LCB

      .PSECT

```

MTADF\$

```

        .MACRO  MTADF$,L,B
        .ASECT
;
; ANSI MAGTAPE SPECIFIC DATA STRUCTURES
;
; VOLUME SET CONTROL BLOCK OFFSET DEFINITIONS (VSCB)
;
; VOLUME SET AND PROCESS CONTROL SECTION
;
.=0
V.TCNT:'L' .BLKW 1      ;TRANSACTION COUNT
V.TYPE:'L' .BLKB 1      ;VOLUME TYPE DESCRIPTOR
V.VCHA:'L' .BLKB 1      ;VOLUME CHARACTERISTICS
V.LABL:'L' .BLKB 12.    ;FILE SET ID (FIRST SIX BYTES)
V.NXT:'L' .BLKW 1      ;PTR TO NEXT VSCB NODE
V.MVL:'L' .BLKW 1      ;PTR TO MOUNTED VOL LIST
V.UVL:'L' .BLKW 1      ;PTR TO UNMOUNTED VOL LIST
V.ATL:'L' .BLKW 1      ;ATL ADDR OF ACCESSING TASK
                        ; TCB IN RSX11M
V.UCB:'L' .BLKW 1      ;ADDR OF CURRENT UCB OR PUD
V.RVOL:'L' .BLKB 1      ;CURRENT RELATIVE VOL #
V.MOU:'L' .BLKB 1      ;MOUNT MODE BYTE
V.TCHR:'L' .BLKW 1      ;UINT CHAR. FOR ALL UNITS USED FOR VOL SET
V.SEQN:'L' .BLKW 1      ;CURRENT FILE SEQUENCE #
V.SECN:'L' .BLKW 1      ;CURRENT FILE SECTION #
V.TPOS:'L' .BLKB 1      ;POSITION OF TAPE IN TM'S TO NXT HDR1
V.PSTA:'L' .BLKB 1      ;PROCESS STATUS BYTE
V.TIMO:'L' .BLKW 1      ;BLOCKED PROCESS TIMEOUT COUNTER
V.STAT:'L' .BLKW 3      ; STATUS WORDS USED BY COMMAND
                        ;EXECUTION MODULES
V.TRTB:'L' .BLKB 1      ;TRANSLATION CONTROL BYTE
V.EFTV:'L' .BLKB 1      ;FOR MAG TO RETURN IE.EOF, EOT, EOY
;
; LABEL DATA SECTION
;
V.BKLG:'L' .BLKW 1      ;BLOCK LENGTH
V.RECL:'L' .BLKW 1      ;RECORD LENGTH
V.FNAM:'L' .BLKW 3      ;FILE NAME
V.FTYP:'L' .BLKW 1      ;FILE TYPE
V.FVER:'L' .BLKW 1      ;FILE VERSION #
V.CDAT:'L' .BLKW 2      ;CREATION DATE
V.EDAT:'L' .BLKW 2      ;EXPIRATION DATE
V.BLKC:'L' .BLKW 2      ;BLOCK COUNT FOR FILE SECTION
V.RTYP:'L' .BLKB 1      ;RECORD TYPE
V.FATT:'L' .BLKB 1      ;FILE ATTRIBUTES FOR CARRIAGE CONTROL
                        .BLKB 30. ;REMAINDER OF FILE ATTRIBUTES
;
; NULL WINDOW SECTION
;
V.WIND:'L' .BLKW 4.      ; NULL WINDOW
V.MST2:'L' .BLKW 1      ;MAGTAPE STATUS BITS
V.FABY:'L' .BLKB 1      ;FILE ACCESSIBILITY BYTE (HDR1)
                        .BLKB 1 ;SPARE
V.ANSN:'L' .BLKB 17.    ;ANSI 17 CHARACTER FILE NAME
V.BoFF:'L' .BLKB 1      ;BUFFER OFFSET
V.DENS:'L' .BLKB 1      ;REQUESTED UNIT DENSITY
V.DRAT:'L' .BLKB 1      ;DEFAULT RECORD ATTRIBUTES
V.DBLK:'L' .BLKW 1      ;DEFAULT BLOCK SIZE
V.DREC:'L' .BLKW 1      ;DEFAULT RECORD SIZE
S.VSCB='B'.             ;SIZE OF VSCB

```


MTADFS\$ (Cont.)

```

        .PSECT
;
; DEFINE OFFSETS INTO NULL WINDOW SECTION
;
        .ASECT
.=0
W.CTL:'L'.BLKW 1                ;CONTROL WORD IN WINDOW
V.WINC='B'V.WIND+W.CTL        ; CNTRL WORD IN NULL WINDOW

        .PSECT
                                ; RELATIVE TO THE VSCB
;
; MOUNTED VOLUME LIST OFFSET DEFINITIONS (MVL)
;
        .ASECT
.=0
        .IF      DF      R$$11M
M.NXT:'L' .BLKW 1                ;PTR TO NXT MVL NODE (11M)
        .ENDC

M.UIC:'L' .BLKW 1                ;OWNER UIC FROM RVOL #1
M.CH:'L' .BLKW 1                ; U.CH/U.VP (11D)
M.PROT:'L' .BLKW 1              ;PROTECTION U.AR IN 11D

        .IF      NDF      R$$11M
        .BLKW 2                ; ACP WORDS 11D
M.NXT:'L' .BLKW 1                ;PTR TO NEXT MVL NODE (11D)
        .ENDC
M.RVOL:'L' .BLKB 1              ;RELATIVE VOL # OF MOUNTED VOLUME
M.STAT:'L' .BLKB 1              ;VOLUME STATUS
M.VIDP:'L' .BLKW 1              ;VOLUME ID POINTER
M.UCB:'L' .BLKW 1              ;ADDR OF ASSOC UCB OR PUD

S.MVL='B'.                      ;SIZE OF MVL NODE

        .PSECT
;
; UNMOUNTED VOLUME AND VOLUME LIST OFFSET DEFINITIONS (UVL)
;
        .ASECT
.=0
L.NXT:'L' .BLKW 1                ;PTR TO NXT UVL NODE
L.VOL1:'L' .BLKB 1              ;REL VOL # OF 1'ST VOL IN NODE
L.VOL2:'L' .BLKB 1              ;REL VOL # OF 2'ND VOL IN NODE
L.VID1:'L' .BLKB 6              ;VOL ID OF 1'ST VOL IN NODE
L.VID2:'L' .BLKB 6              ;VOL ID OF 2'ND VOL IN NODE
S.UVL='B'.                      ;SIZE OF UVL NODE

        .PSECT
;
; SYSTEM DATA STRUCTURE CONTENT VALUES
;
; VSCB VALUES

```

MTADFS\$ (Cont.)

; V.MOU VALUES

VM.OLD	= 'B'	200	;OLD .FL300 VOLUME -- VM.BYP WILL ALSO BE SET
VM.BYP	= 'B'	100	;BYPASS LABEL PROCESSING
VM.ULB	= 'B'	40	;UNLABELED TAPE
VM.FSC	= 'B'	20	;OVERRIDE FILE SET ID CHECK
VM.EXC	= 'B'	10	;OVERRIDE EXPRIATION DATE CHECK

; V.MST2 VALUES

V2.INI	= 'B'	1	;MAG WANTS US TO INITIALIZE NEXT OUTPUT
V2.XH2	= 'B'	2	;THIS FILE HAS NO HDR2, DON'T WRITE EOF2
V2.XH3	= 'B'	4	;THIS FILE HAS NO HDR3, DON'T WRITE EOF3
V2.NH3	= 'B'	10	;DON'T WRITE HDR3/EOX3 LABELS
V2.OAC	= 'B'	20	;OVERRIDE FILE/VOLUME ACCESIBILITY

; V.PSTA VALUES - UNBLOCKED TRANSITION STATE

VP.RM	= 'B'	2	;READ DATA MODE
VP.WM	= 'B'	4	;WRITE DATA MODE
VP.UCM	= 'B'	6	;UNLABELLED CREATE POSITIONING MODE
VP.SM	= 'B'	10	;SEARCH MODE
VP.MOU	= 'B'	20	;MOUNT MODE
VP.RWD	= 'B'	40	;REWIND OR VOL VERIFICATION WAIT
VP.VFY	= 'B'	VP.RWD	
VP.POS	= 'B'	100	;PROCESS IN POSITIONING MODE
			; (MULTI-SECTION FILE)

;

; BLOCKED STATE = -(UNBLOCKED TRANSITION STATE VALUES)

;

;PROCESS TIMED OUT BIT 0 = 1

 VP.TO='B'1

; NULL WINDOW CONTROL BIT DEFINITIONS

WI.RDV	= 'B'	400	;ACCESSED FOR READ
WI.WRV	= 'B'	1000	;ACCESSED FOR WRITE
WI.EXT	= 'B'	2000	;ACCESSED FOR EXTEND
WI.LCK	= 'B'	4000	;LOCKED

; MVL VALUES IN THE M.STAT FIELD

MS.VER	= 'B'	200	;VOL ID NOT VERIFIED
MS.RID	= 'B'	1	;VOL ID TO BE READ NOT CHECKED
MS.NMO	= 'B'	2	;MOUNT MESSAGE NOT GIVEN YET
MS.TMO	= 'B'	4	;ONE TIMEOUT ALREADY EXPRIED
MS.EXP	= 'B'	10	;EXPIRATION DATE MESSAGE GIVEN

; MISC BITS USED IN MOUNT (STORED IN V.STS)

MO.OVR	= 'B'	1	; OVER RIDE VOL NAME SWITCH
MO.UIC	= 'B'	2	; EXPLICIT UIC GIVEN
MO.PRO	= 'B'	4	; EXPLICIT PROTECTION GIVEN
MO.160	= 'B'	10	; 1600 BPI SPECIFIED

.ENDM

OLRDFS

```

.MACRO OLRDFS $$$GBL

;
; THIS MODULE DEFINES THE ONLINE RECONFIGURATION INTERFACE
; AS IMPLEMENTED BETWEEN THE RSX-11M-PLUS TASKS CON, HRC, AND
; THE RDDR.
;

;
; DEFINE THE I/O FUNCTION CODES FOR ONLINE RECONFIGURATION CONTROL.
;

.MCALL .WORD.,DEFIN$
.IF IDN <$$$GBL>,<DEF$G>
...GBL=1
.IFF
...GBL=0
.ENDC

;
; THE FOLLOWING MACRO DEFINES THE SUB-FUNCTION CODES FOR EACH OF THE
; OPERATIONS PERFORMED BY THE HRC TASK AND A PARAMETER DESCRIBING THE
; ARGUMENTS REQUIRED FOR EACH FUNCTION. IN A MACRO CALL THE FOLLOWING
; ARE THE LEGAL COMBINATIONS FOR THE 'MASK' PARAMETER:
;
;          <>          SIGNIFYING NO PARAMETERS
;          <D>         SIGNIFYING ONE BUFFER DESCRIPTOR
;          <D,D>       SIGNIFYING TWO BUFFER DESCRIPTORS
;          <D,CT>      SIGNIFYING ONE DESCRIPTOR AND 'CT'
;                     BYTES OF PARAMETERS
;          <CT>        SIGNIFYING 'CT' BYTES OF PARAMETERS
;

.MACRO FUNC          NAME,SUBF,FUN,MASK
.WORD. IO.'NAME,SUBF,FUN
FUNCA NAME,<MASK>
.ENDM

.MACRO FUNCA NAME,MSK
PARCT=0
DE SCT=0
.IRP X,<MSK>
.IIF IDN <X>,<P> PARCT=PARCT+1
.IIF IDN <X>,<D> DE SCT=DE SCT+1
.IIF GT <PARCT-17> .ERROR INVALID PARAMETER COUNT
.IIF GT <DE SCT-17> .ERROR INVALID DESCRIPTOR COUNT
.ENDR

TEMP=<DE SCT*4>+<PARCT*2>
.WORD. IO$'NAME,<<DE SCT*20+PARCT>>,TEMP
.ENDM

;
; DEFINE ONLINE RECONFIGURATION I/O FUNCTIONS
;

.WORD. IO.MFC,000,001 ; MULTI-FUNCTION MODIFY CONFIGURATION
.WORD. IO.RSC,000,002 ; READ SYSTEM CONFIGURATION
.WORD. IO.WSC,000,006 ; MODIFY DEVICE CONFIGURATION

```

OLRDFS\$ (Cont.)

```

;
; DEFINE SUBFUNCTIONS TO MODIFY DEVICE CONFIGURATION
;

FUNC    ONL,001,006,<D,D>      ; SET DEVICE ONLINE
FUNC    OFL,002,006,<D,D>      ; SET DEVICE OFFLINE
FUNC    MAI,003,006,<D,D>      ; SET DEVICE IN MAINTAINENCE MODE
FUNC    CAC,004,006,<>         ; CACHE CONTROL
FUNC    MEM,005,006,<>         ; MIND CONTROL
FUNC    STN,006,006,<P,P>      ; RECONFIGURATION CONTROL,
                                ; SPECIFY TASK NAME
FUNC    HRC,007,006,<P,P>      ; RECONFIGURATION CONTROL,
                                ; HRC OPERATING MODE
FUNC    ONE,010,006,<P,P>      ; ON <CONDITION> <COMMAND>
FUNC    STA,011,006,<D>        ; RETURN DEVICE STATE
FUNC    IF ,012,006,<P,P>      ; IF <CONDITION> <COMMAND>
FUNC    RLI,013,006,<D,D,D,D>  ; LINK UNIBUS RUN
FUNC    RUL,014,006,<D,D,D,D>  ; UNLINK UNIBUS RUN
FUNC    MBO,015,006,<P,P,D,D,D,D,D,D,D,D> ; MEMORY BOX ONLINE
FUNC    RSW,016,006,<D,D,D,D>  ; SWITCH BUS
FUNC    WAT,017,006,<D>        ; WRITE ATTRIBUTES
FUNC    RAT,020,006,<D,D>      ; READ ATTRIBUTES
FUNC    MBF,021,006,<P,P,D,D,D,D,D,D,D,D> ; MEMORY BOX OFFLINE

IO$MAX=21                      ; DEFINE MAXIMUM SUBFUNCTION

DEFIN$ IS.HRG,6.              ; STOP PROCESSING CONDITION ENCOUNTERED
                                ; SECOND STATUS WORD IS ARGUMENT

;
; DEFINE A MACRO, WHICH WHEN EXPANDED WITH THE APPROPRIATE DEFINITION
; FOR .IOER. WILL DEFINE THE PRIVATE ERROR CODES USED BY HRC AND CON.
;

.MACRO OLREM$

$$$VAL=-256.                  ; DEFINE INITIAL ERROR NUMBER VALUE

.IOER. IE$DAL,<DEVICE already linked>
.IOER. IE$DNL,<DEVICE not linked>
.IOER. IE$PRM,<Parameter error>
.IOER. IE$SYN,<Syntax error>
.IOER. IE$AFE,<Attribute format error>
.IOER. IE$TMU,<HRC... Internal tables insufficient for this system>
.IOER. IE$CAB,<Unable to access busrun>
.IOER. IE$TRP,<HRC... internal addressing error>
.IOER. IE$ALG,<Memory box parameter error>
.IOER. IE$TQU,<Timeout on unit quieting operation>
.IOER. IE$EPO,<ONLINE CPU failure>
.IOER. IE$EUO,<ONLINE UNIT failure>
.IOER. IE$ECO,<ONLINE CONTROLLER failure>
.IOER. IE$EPF,<OFFLINE CPU failure>
.IOER. IE$EUF,<OFFLINE UNIT failure>
.IOER. IE$ECF,<OFFLINE CONTROLLER failure>
.IOER. IE$CFU,<Attempt to quiet unit for controller failed>
.IOER. IE$CSR,<CSR for controller not present in I/O page>
.IOER. IE$SWF,<Unable to switch unit away from current controller>
.IOER. IE$ICE,<HRC... detected I/O database consistancy error>
.IOER. IE$SCE,<Executive or Driver status change error>
.IOER. IE$MDE,<HRC... Memory descriptor format error>

```


OLRDF\$ (Cont.)

```

.IOER. IE$NFW,<No path to target device is available>
.IOER. IE$CXT,<Unable to take unit with context offline.>
.IOER. IE$IDU,<Invalid device descriptor>
.IOER. IE$UNK,<Device is unknown in this configuration>
.IOER. IE$SZE,<HRC... Unable to access device to size drive>
.IOER. IE$POB,<HRC... Can't take box offline. Partition overmaps box>
.IOER. IE$NLB,<HRC... Can't take box offline. Not last box in memory>
.IOER. IE$OMP,<HRC... Can't modify partition size. Overmap exists>
.IOER. IE$POC,<HRC... Can't modify partition size. Occupied>
.IOER. IE$DFE,<HRC... Request format error.>
.IOER. IE$IDS,<HRC... Invalid device specification.>
.IOER. IE$UOE,<HRC... Unknown error from online/offline call>
.ENDM

;
; CONDITION CODES FOR CONDITIONS TESTED BY IO.ONE AND IO.IF FUNCTIONS
;

CO$ONL = 1           ; IF DEVICE NOW ONLINE
CO$OFL = 2           ; IF DEVICE NOW OFFLINE
CO$UNK = 3           ; UNKNOWN DEVICE
CO$ACC = 4           ; ACCESSABLE (ACCESS PATH EXISTS)
CO$ANY = 5           ; ANY ERROR CONDITION
CO$MAI = 6           ; MAINTENANCE MODE

CO$MAX = 6           ; MAXIMUM CODE

;
; CONDITION COMMAND CODES FOR IO.ONE AND IO.IF FUNCTIONS
;

CD$STO = 2           ; 'STOP' COMMAND
CD$GOT = 4           ; 'GOTO'
CD$CON = 6           ; 'CONTINUE'

CD$MAX = 6           ; MAXIMUM CONDITION DEFINED

;
; ARGUMENT DEFINITION FOR IO.HRC FUNCTION
;

M$LOG = 1           ; SUPPRESS CONFIGURATION TRANSMISSION TO ERRLOG
M$INIT = 2          ; INITIALIZE HRC
M$DEBG = 4          ; SET HRC INTO DEBUG MODE. (DEVELOPMENT ONLY)
M$EXIT = 10         ; EXIT REQUEST (FROM ABORT AST REQUEST)

;
; DEFINE TABLE OFFSETS AND STATUS BITS RETURNED IN RESPONSE TO
; A 'READ CONFIGURATION' QIO
;

.ASECT
.=0
C$DTP: .BLKB 1      ; ENTRY TYPE FIELD

;
; ENTRY TYPE CODES ARE AS FOLLOWS
;

```

OLRDF\$ (Cont.)

```

ET$HDR = 1          ; CONFIGURATION HEADER ENTRY
ET$END = 2          ; END OF CONFIGURATION DATA
ET$DEV = 'A         ; MINIMUM VALUE FOR DEVICE SPECIFICATION
                   ; ENTRY

C$DECT: .BLKB      1      ; COUNT OF TABLE ENTRIES (CPUS+SWITCHED
                           ; BUS RUNS+CONTROLLERS+UNITS)
C$DVER: .BLKB      1      ; VERSION OF RECONFIGURATION TASK PROTOCOL
C$DSTD: .BLKB      1      ; SIZE OF HEADER
C$DMUB: .BLKB      1      ; MAXIMUM UNIBUS RUNS SUPPORTED
C$DMCT: .BLKB      1      ; MAXIMUM CONTROLLERS OF A GIVEN TYPE
                           ; SUPPORTED

               .EVEN
C$DFAC: .BLKW      2      ; FACILITES SUPPORTED IN HOST SYSTEM
C$DIDN: .BLKW      9.     ; HRC VERSION AND BUILD TIMESTAMP
C$STD:   .          ; SIZE OF THE TABLE HEADER

;
; OFFSETS WITHIN THE FIXED PORTION OF A GIVEN ENTRY
;
               .=0

C$DTYP:           ; ENTRY TYPE CODE
C$DNAM: .BLKW      1      ; TWO ASCII CHARACTER UNIT OR CONTROLLER NAME
C$DPUN: .BLKB      1      ; CONTROLLER NUMBER (0-255.)
C$DLUN: .BLKB      1      ; LOGICAL UNIT NUMBER IF THIS DEVICE IS A UNIT
C$DSCT: .BLKB      1      ; SUB-CONTROLLER NUMBER
C$DEVT: .BLKB      1      ; DEVICE TYPE CODE
C$DSTS: .BLKW      1      ; DEVICE STATUS MASK

;
; FLAG VALUES FOR C$DSTS
;

CS$ATR=1          ; VARIABLE LENGTH ATTRIBUTE INFO IS APPENDED
CS$EXF=76         ; FIELD IN C$DSTS CONTAINING COUNT OF ADDITIONAL
                   ; BYTES IN THIS DEVICE ENTRY
CS$SUB=100        ; THIS IS A SUB-CONTROLLER DEVICE
;CS$XXX=200       ; UNUSED
CS$OFL=400        ; 1=>DEVICE IS OFFLINE, 0=>DEVICE IS ONLINE
CS$PDF=1000       ; DEVICE IS RESTRICTED TO PRIVILEGED DIAG FNS
CS$POR=2000       ; THIS IS A MULTIPOINT DEVICE
CS$MBD=4000       ; DEVICE IS A MASS BUS DEVICE
CS$UNK=10000      ; DEVICE IS UNKNOWN
CS$ACC=20000      ; AN ONLINE ACCESS PATH EXISTS TO THIS DEVICE
CS$MTD=40000      ; DEVICE IS MOUNTED(DISK) OR LOGGED IN (TERM)
CS$DRV=100000     ; A DRIVER IS LOADED FOR THIS DEVICE

C$DST2: .BLKW      1      ; STATUS EXTENSION

CS$PUN=20         ; 1=> THIS DEVICE SPECIFIED WITH PHYSICAL
                   ; UNIT NUMBER
CS$CRD=40         ; 1=> THIS IS A CONTROLLER RELATIVE DEVICE SPEC
CS$PRC=100        ; 1=> THIS IS A PORT RELATIVE CONTROLLER SPEC
CS$CTL=200        ; DEVICE IS A CONTROLLER (MUST BE SIGN BIT)
CS$DCL=3400       ; DEVICE CLASS CODE FIELD. MUST BE LOW ORDER
                   ; BIT OF HIGH BYTE.

```


OLRDF\$ (Cont.)

```

;
; DEVICE CLASS VALUES
;

      DC$UNI = 0          ; UNIT
      DC$CTL = 1          ; CONTROLLER
      DC$MKU = 2          ; MEMORY BOX UNIT
      DC$MKC = 3          ; MEMORY BOX CONTROLLER
      DC$SBU = 4          ; SWITCHED BUS UNIT
      DC$SBC = 5          ; SWITCHED BUS CONTROLLER
      DC$CPU = 6          ; CPU
      DC$XXX = 7          ; UNUSED

C$DDAT: .BLKW    2          ; DEVICE DEPENDANT DATA
C$SME:           ; SIZE IF A MINIMUM ENTRY

;
; VARIABLE PORTION OF A GIVEN ENTRY
;

;
; FOR CONTROLLERS
;
      . = C$SME

C$DKPO: .BLKW    1          ; PORT-STATUS-WORD. THIS DESCRIBES THE BUS RUN
                                ; CPU OR SWITCHED BUS, TO WHICH THIS
                                ; CONTROLLER IS CONNECTED.
C$SCT:           ; MINIMUM SIZE OF A CONTROLLER ENTRY

;
; FOR UNIT ENTRIES
;
      . = C$SME

C$DCTN: .BLKW    1          ; CONTROLLER NAME. TWO CHARACTER ASCII CODE
                                ; OF THE CONTROLLER TO WHICH THIS UNIT IS
                                ; ATTACHED.
C$DUPO: .BLKW    1          ; PORT-STATUS-WORD. THIS IS THE
                                ; FIRST OF THE PSWS DESCRIBING THE CONTROLLER(S)
                                ; TO WHICH THIS UNIT IS CONNECTED.
C$SUN:           ; MINIMUM SIZE OF A UNIT ENTRY

;
; FOR CPU-S
;
      . = C$SME

C$DCPO: .BLKW    1          ; PORT-STATUS-WORD. THIS IS THE BUS
                                ; NUMBER FOR THIS CPU.
C$SCP:           ; MINIMUM SIZE OF A CPU ENTRY

;
; FOR MEMORY BOXES
;

```

OLRDF\$ (Cont.)

```

.=C$SME

C$DCTN: .BLKW 1 ; CONTROLLER NAME.
        .BLKW 4 ; MAXIMUM OF 4 PORTS FOR MEMORY CONTROLLERS

C$SMB: ; MAXIMUM SIZE OF A MEMORY BOX ENTRY

;
; STATUS BIT DEFINITIONS FOR THE PORT STATUS WORD
;

CP$OFL=400 ; 1=> PORT IS OFFLINE
CP$XXX=1000 ; UNUSED
CP$CUR=2000 ; THIS PORT IS THE CURRENT PORT (S.KRB
            ; REFERENCES THIS PORT
CP$XXX=4000 ; UNUSED
CP$XXX=10000 ; UNUSED
CP$ACC=20000 ; THIS PORT HAS AN ACCESS PATH
CP$MTD=40000 ; PORT HAS CONTEXT OR SERVICES A DEVICE HAVING
            ; CONTEXT
CP$XXX=100000 ; UNUSED

;
; DEVICE ATTRIBUTES CODES
;

.MACRO ATT NAME,SIZ
$$$TMP=$$TMP+1
DEFIN$ DA$'NAME,$$$TMP!<400*SIZ>
.ENDM

$$$TMP=0

ATT CSR,2 ; CSR ADDRESS
ATT VEC,2 ; VECTOR ADDRESS
ATT UBR,2 ; UNIBUS RUN
ATT TYP,2 ; DEVICE TYPE, READ ONLY
ATT VOL,12. ; MOUNTED VOLUME NAME, READ ONLY
ATT ERR,10 ; DEVICE ERROR COUNTERS, READ/WRITE
ATT PRI,2 ; DEVICE INTERRUPT PRIORITY
ATT MBP,6 ; MEMORY BOX PARAMETER
ATT STE,2 ; SANITY TIMER ENABLE/DISABLE
ATT SAL,2 ; ALARM ENABLE/DISABLE
ATT DSN,2 ; DEVICE SERIAL NUMBER
ATT CSN,10 ; CPU SERIAL NUMBERS

;
; MEMORY BOX ATTRIBUTE BUFFER
;

.ASECT
.=0

C$MBAS: .BLKW 1 ; BASE ADDRESS OF BOX
C$MINT: .BLKB 1 ; INTERLEAVE FACTOR
        .BLKB 1 ; FREE BYTE
C$MSIZ: .BLKW 1 ; SIZE OF BOX IN 32 WORD BLOCKS
C$MGRN: .BLKW 1 ; BOX GRANULARITY. "BYTES-PER-UNIT"

C$MDSC: ; SIZE OF BOX ATTRIBUTE BUFFER

```


OLRDF\$ (Cont.)

```

.PSECT

;
; REDEFINE MACRO TO NULL
;

.MACRO OLRDF$ X
.ENDM
.MACRO ATT X
.ENDM

.ENDM

;
; MACRO FOR THE DEFINITION OF DEVICE TYPE CODES
;

.MACRO DEVCD$ $$$GBL
.MCALL DEFIN$

  .IF IDN <$$$GBL>,<DEF$G>
...GBL=1
  .IFF
...GBL=0
  .ENDC

.MACRO DEV X
DEFIN$ D$'X,$$$TMP
$$$TMP=$$$TMP+1
.ENDM

$$$TMP = 0

DEV UDET      ; UNDETERMINED DEVICE TYPE
DEV UKNO      ; UNKNOWN DEVICE TYPE

DEV RK03      ; RK03
DEV RK05      ; RK05
DEV RK5F      ; RK05-F (DUAL DENSITY FIXED CARTRIDGE)

DEV RX01      ; RX01
DEV RX02      ; RX02 (DUAL DENSITY RX01)

DEV RL01      ; RL01
DEV RL02      ; RL02

DEV RP02      ; RP02
DEV RP03      ; RP03
DEV RP04      ; RP04
DEV RP05      ; RP05
DEV RP06      ; RP06
DEV RP07      ; RP07

DEV RK06      ; RK06
DEV RK07      ; RK07

```

OLRDF\$ (Cont.)

```

DEV RM02      ; RM02
DEV RM03      ; RM03
DEV RM05      ; RM05
DEV RM80      ; RM80

DEV RS03      ; RS03
DEV RS04      ; RS04 (DUAL DENSITY RS03)

DEV RF11      ; RF11/RS08

DEV TK25      ; TK25
DEV TK50      ; TK50
DEV TU10      ; TU10
DEV TU16      ; TU16
DEV TU45      ; TU45
DEV TU77      ; TU77
DEV TU78      ; TU78
DEV TS11      ; TS11
DEV TSU0      ; TSU05
DEV TSV0      ; TSV05
DEV TU80      ; TU80
DEV TU81      ; TU81

DEV TM02      ; TM02
DEV TM03      ; TM03
DEV TM78      ; TM78

DEV TU56      ; TU56
DEV TU58      ; TU58
DEV TU60      ; TU60

DEV MSCP      ; UDA50
DEV RA60      ; RA60
DEV RA80      ; RA80
DEV RA81      ; RA81
DEV RC25      ; RC25 (AZTEC)

DEV RD50      ; RD50
DEV RD51      ; RD51
DEV RX50      ; RX50

DEV ML11      ; ML11

DEV TERM      ; TERMINAL

$$$TMP=370
DEV USR0      ; USER TYPE 0
DEV USR1      ; USER TYPE 1
DEV USR2      ; USER TYPE 2
DEV USR3      ; USER TYPE 3
DEV USR4      ; USER TYPE 4
DEV USR5      ; USER TYPE 5
DEV USR6      ; USER TYPE 6
DEV USR7      ; USER TYPE 7

.MACRO DEVCD$
.ENDM
.MACRO DEV X
.ENDM

.ENDM

```


PCBDF\$

```

.MACRO PCBDF$ L,B

;+
; MAIN PARTITION PCB
;-

.ASECT
.=0
P.LNK:'L'.BLKW 1 ;LINK TO NEXT MAIN PARTITION PCB
               .BLKW 1 ;(UNUSED)
P.NAM:'L'.BLKW 2 ;PARTITION NAME IN RAD50
P.SUB:'L'.BLKW 1 ;POINTER TO FIRST SUBPARTITION
P.MAIN:'L'.BLKW 1 ;POINTER TO SELF
P.REL:'L'.BLKW 1 ;STARTING PHYSICAL ADDRESS IN 32W BLOCKS
P.BLKS:'L'
P.SIZE:'L'.BLKW 1 ;SIZE OF PARTITION IN 32W BLOCKS
P.WAIT:'L'.BLKW 2 ;PARTITION WAIT QUEUE LISTHEAD
               .BLKW 2 ;(UNUSED)
P.STAT:'L'.BLKW 1 ;PARTITION STATUS FLAGS
P.ST2:'L'.BLKW 1 ;STATUS EXTENSION FOR COMMON AND MAIN PCB'S
               .BLKW 3 ;(UNUSED)

P.HDLN:'L'.BLKB 1 ;SIZE OF EXTERNAL HEADER IN 32W BLOCKS
P.IOC:'L'.BLKB 1 ;PARTITION I/O COUNT

$$$=.

P.RRM:'L'.BLKW 1 ;REQUIRED RUN MASK

      .IF NDF M$$PRO

      .=$$$

      .ENDC

      .IF NB SYSDEF

P.LGTH='B'. ;PARTITION CONTROL BLOCK LENGTH

      .ENDC

;+
; TASK REGION PCB
;-

.=0
P.LNK:'L'.BLKW 1 ;UTILITY LINK WORD
P.PRI:'L'.BLKB 1 ;PRIORITY OF PARTITION
P.RMCT:'L'.BLKB 1 ;RESIDENT MAPPED TASKS COUNT
P.NAM:'L'.BLKW 2 ;PARTITION NAME IN RAD50
P.SUB:'L'.BLKW 1 ;POINTER TO NEXT SUBPARTITION
P.MAIN:'L'.BLKW 1 ;POINTER TO MAIN PARTITION
P.REL:'L'.BLKW 1 ;STARTING PHYSICAL ADDRESS IN 32W BLOCKS
P.BLKS:'L'

```

PCBDF\$ (Cont.)

```

P.SIZE:'L'.BLKW 1      ;SIZE OF PARTITION IN 32W BLOCKS
      .BLKW 1          ;(UNUSED)
P.SWSZ:'L'.BLKW 1      ;PARTITION SWAP SIZE
P.DPCB:'L'.BLKW 1      ;CHECKPOINT ALLOCATION PCB
P.TCB:'L'.BLKW 1       ;TCB ADDRESS OF OWNER TASK
P.STAT:'L'.BLKW 1      ;PARTITION STATUS FLAGS
P.HDR:'L' .BLKW 1      ;POINTER TO HEADER CONTROL BLOCK
      .BLKW 1          ;(UNUSED)
P.ATT:'L' .BLKW 2      ;ATTACHMENT DESCRIPTOR LISTHEAD

P.HDLN:'L'.BLKB 1      ;SIZE OF EXTERNAL HEADER IN 32W BLOCKS
P.IOC:'L' .BLKB 1      ;PARTITION I/O COUNT

$$$=.

P.RRM:'L'.BLKW 1      ;REQUIRED RUN MASK

      .IF NDF M$$PRO

      .=$$$

      .ENDC

;+
; COMMON REGION PCB
;-

.=0
P.LNK:'L'.BLKW 1      ;UTILITY LINK WORD
P.PRI:'L'.BLKB 1      ;PRIORITY OF PARTITION
P.RMCT:'L'.BLKB 1      ;RESIDENT MAPPED TASKS COUNT
P.NAM:'L'.BLKW 2      ;PARTITION NAME IN RAD50
P.SUB:'L'.BLKW 1      ;POINTER TO NEXT SUBPARTITION
P.MAIN:'L'.BLKW 1      ;POINTER TO MAIN PARTITION
P.REL:'L'.BLKW 1      ;STARTING PHYSICAL ADDRESS IN 32W BLOCKS
P.BLKS:'L'
P.SIZE:'L'.BLKW 1      ;SIZE OF PARTITION IN 32W BLOCKS
P.CBDL:'L'.BLKW 1      ;COMMON BLOCK DIRECTORY LINK
P.CSBA:'L'
; CACHE STATISTICS BLOCK LISTHEAD
; ... (IF P2.CHE IS SET, PARTITION WON'T SWAP)
P.SWSZ:'L'.BLKW 1      ;PARTITION SWAP SIZE
P.DPCB:'L'.BLKW 1      ;POINTER TO DISK PCB
P.OWN:'L' .BLKW 1      ;OWNING UIC OF REGION
P.STAT:'L'.BLKW 1      ;PARTITION STATUS FLAGS
P.ST2:'L' .BLKW 1      ;STATUS EXTENSION FOR COMMON AND MAIN PCB'S
P.PRO:'L' .BLKW 1      ;PROTECTION WORD [DEWR,DEWR,DEWR,DEWR]
P.ATT:'L' .BLKW 2      ;ATTACHMENT DESCRIPTOR LISTHEAD

P.HDLN:'L'.BLKB 1      ;SIZE OF EXTERNAL HEADER IN 32W BLOCKS
P.IOC:'L' .BLKB 1      ;PARTITION I/O COUNT

$$$=.

P.RRM:'L'.BLKW 1      ;REQUIRED RUN MASK

```


PCBDF\$ (Cont.)

```

        .IF NDF M$$PRO

        .=$$$

        .ENDC

        .PSECT

;+
; PARTITION STATUS WORD BIT DEFINITIONS
;-

PS.OUT='B'100000      ;PARTITION IS OUT OF MEMORY(1=YES)
PS.CKP='B'40000        ;PARTITION CHECKPOINT IN PROGRESS (1=YES)
PS.CKR='B'20000        ;PARTITION CHECKPOINT IS REQUESTED (1=YES)
PS.CHK='B'10000        ;PARTITION IS NOT CHECKPOINTABLE (1=YES)
PS.FXD='B'4000         ;PARTITION IS FIXED (1=YES)
PS.CAF='B'2000         ;CHECKPOINT SPACE ALLOCATION FAILURE (1=YES)
PS.LIO='B'1000         ;MARKED BY SHUFFLER FOR LONG I/O (1=YES)
PS.NSF='B'400          ;PARTITION IS NOT SHUFFLEABLE (1=YES)
PS.COM='B'200          ;LIBRARY OR COMMON BLOCK (1=YES)
PS.LFR='B'100          ;LAST LOAD OF REGION FAILED (1=YES)
PS.PER='B'40           ;PARTIY ERROR OCCURED IN THIS REGION (1=YES)
PS.NWB='B'20           ;COMMON SHOULDN'T BE WRITTEN BACK
PS.DEL='B'10           ;PARTITION SHOULD BE DELETED WHEN NOT ATTACHED
                        : (1=YES)
PS.AST='B'4            ;PARTITION HAS REGION LOAD AST PENDING

;+
; REQUIRED RUN MASK
;-

PR.UBT='B'100000      ;UNIBUS RUN T
PR.UBS='B'40000        ;UNIBUS RUN S
PR.UBR='B'20000        ;UNIBUS RUN R
PR.UBP='B'10000        ;UNIBUS RUN P
PR.UBN='B'4000         ;UNIBUS RUN N
PR.UBM='B'2000         ;UNIBUS RUN M
PR.UBL='B'1000         ;UNIBUS RUN L
PR.UBK='B'400          ;UNIBUS RUN K
PR.UBJ='B'200          ;UNIBUS RUN J
PR.UBH='B'100          ;UNIBUS RUN H
PR.UBF='B'40           ;UNIBUS RUN F
PR.UBE='B'20           ;UNIBUS RUN E
PR.CPD='B'10           ;PROCESSOR D
PR.CPC='B'4            ;PROCESSOR C
PR.CPB='B'2            ;PROCESSOR B
PR.CPA='B'1            ;PROCESSOR A

;+
; STATUS EXTENSION WORD BIT DEFINITIONS
; (THESE BITS CAN ONLY BE EXAMINED IN COMMON OR MAIN PCB'S)
;-

```

PCBDFS\$ (Cont.)

```

P2.LMA='B'40000
P2.CPC='B'20000
P2.CHE='B'10000
P2.SEC='B'4000

P2.PAR='B'2000
P2.POL='B'1000
P2.CPU='B'400
P2.PIC='B'200
P2.RON='B'100
P2.DRV='B'40
P2.APR='B'7

;+
; CHECKPOINT FILE PCB
;-

.ASECT
.=0
P.LNK:'L' .BLKW 1
P.UCB:'L' .BLKW 1
P.LBN:'L' .BLKW 1
      .BLKW 1
P.SUB:'L' .BLKW 1
P.MAIN:'L' .BLKW 1
P.REL:'L' .BLKW 1
P.SIZE:'L' .BLKW 1
P.DLGH='B'

;LINK WORD OF CHECKPOINT FILE PCB'S
;UCB ADDRESS OF CHECKPOINT FILE DEVICE
;HIGH PART OF STARTING LBN
;LOW PART OF STARTING LBN
;POINTER TO FIRST CHECKPOINT ALLOCATION PCB
;MUST BE 0 (FOR $RLPRL)
;CONTAINS 0 IF FILE IN USE, 1 IF NOT IN USE
;SIZE OF CHECKPOINT FILE IN 256W BLOCKS
;LENGTH OF ALL DISK PCB'S

;+
; CHECKPOINT ALLOCATION PCB
;-

.=0
      .BLKW 4
P.SUB:'L' .BLKW 1
P.MAIN:'L' .BLKW 1
P.REL:'L' .BLKW 1
P.SIZE:'L' .BLKW 1

;(UNUSED)
;LINK TO NEXT CHECKPOINT ALLOCATION PCB
;ADDRESS OF CHECKPOINT FILE PCB
;RELATIVE POSITION IN FILE IN 256W BLOCKS
;SIZE ALLOCATED IN 256W BLOCKS

;+
; COMMON TASK IMAGE FILE PCB
;-

.=0
P.FID1:'L' .BLKW 1
P.UCB:'L' .BLKW 1
P.LBN:'L' .BLKW 1
      .BLKW 1
P.FID2:'L' .BLKW 1
P.MAIN:'L' .BLKW 1
P.REL:'L' .BLKW 1
P.FID3:'L' .BLKW 1

;FILE ID WORD FOR SAVE
;UCB ADDRESS OF DEVICE ON WHICH COMMON RESIDES
;HIGH PART OF STARTING LBN
;LOW PART OF STARTING LBN
;FILE ID WORD FOR SAVE
;POINTER TO SELF
;ALWAYS CONTAINS A 0
;FILE ID WORD FOR SAVE

;+
; ATTACHMENT DESCRIPTOR OFFSETS
;-

```


PCBDF\$ (Cont.)

```

.ASECT
.=0
A.PCBL:'L'.BLKW 1      ;PCB ATTACHMENT QUEUE THREAD WORD
A.PRI:'L'.BLKB 1      ;PRIORITY OF ATTACHED TASK
A.IOC:'L'.BLKB 1      ;I/O COUNT THROUGH THIS DESCRIPTOR
A.TCB:'L'.BLKW 1      ;TCB ADDRESS OF ATTACHED TASK
A.TCBL:'L'.BLKW 1      ;TCB ATTACHMENT QUEUE THREAD WORD
A.STAT:'L'.BLKB 1      ;STATUS BYTE
A.MPCT:'L'.BLKB 1      ;MAPPING COUNT OF TASK THRU THIS DESCRIPTOR
A.PCB:'L'.BLKW 1      ;PCB ADDRESS OF ATTACHED TASK
A.LGTH='B'.          ;LENGTH OF ATTACHMENT DESCRIPTOR

;+
; ATTACHMENT DESCRIPTOR STATUS BYTE BIT DEFINITIONS
;-

.PSECT
AS.PRO='B'100          ;A.TCB IS SEC POOL TCB BIAS (1=YES)
AS.SBP='B'20           ;CACHE BYPASS REQUESTED
AS.RBP='B'40           ;REQUEST TO NOT BYPASS CACHE
AS.DEL='B'10          ;TASK HAS DELETE ACCESS (1=YES)
AS.EXT='B'4            ;TASK HAS EXTEND ACCESS (1=YES)
AS.WRT='B'2            ;TASK HAS WRITE ACCESS (1=YES)
AS.RED='B'1            ;TASK HAS READ ACCESS (1=YES)

.MACRO PCBDF$ X,Y,Z
.ENDM
.ENDM

```

PKTDF\$

```
.MACRO PKTDF$,L,B
```

```
;+
; ASYNCHRONOUS SYSTEM TRAP CONTROL BLOCK OFFSET DEFINITIONS
;
; SOME POSITIONAL DEPENDENCIES BETWEEN THE OCB AND THE AST CONTROL BLOCK
; ARE RELIED UPON IN THE ROUTINE $FINXT IN THE MODULE SYSXT.
;-
```

```
.ASECT
```

```
. =177774
```

```
A.KSR5:'L' .BLKW 1
```

```
A.DQSR:'L' .BLKW 1
```

```
.BLKW 1
```

```
A.CBL:'L' .BLKW 1
```

```
;SUBROUTINE KISAR5 BIAS (A.CBL=0)
;DEQUEUE SUBROUTINE ADDRESS (A.CBL=0)
;AST QUEUE THREAD WORD
;LENGTH OF CONTROL BLOCK IN BYTES
;IF A.CBL = 0, THE AST CONTROL BLOCK IS
;TO BE DEALLOCATED BY THE DEQUEUE SUBROUTINE
;POINTED TO BY A.DQSR MAPPED VIA APR 5
;VALUE A.KSR5. THIS IS CURRENTLY USED ONLY
;BY THE FULL DUPLEX TERMINAL DRIVER FOR
;UNSOLICITED CHARACTER ASTS.
;IF THE LOW BYTE OF A.CBL = 0, AND THE
;HIGH BYTE IS NOT = 0, THE AST CONTROL BLOCK
;IS A SPECIFIED AST, WITH LENGTH, C.LGTH.
;IF THE HIGH BYTE OF A.CBL=0
;AND THE LOW BYTE > 0, THEN
;THE LOW BYTE IS THE LENGTH OF THE
;AST CONTROL BLOCK.
;IF HIGH BYTE = 0 AND LOW BYTE IS NEGATIVE,
;THEN THE BLOCK IS A KERNEL AST
;BIT 6 IS SET IF $SGFIN SHOULD
;NOT BE CALLED PRIOR TO DISPATCHING
;THE AST, AND THE LOW SIX BITS (5-0)
;REPRESENT THE INDEX/2 INTO THE
;KERNEL AST DISPATCH TABLE ($KATBL)
;NUMBER OF BYTES TO ALLOCATE ON TASK STACK
;AST TRAP ADDRESS
;NUMBER OF AST PARAMETERS
;FIRST AST PARAMETER
;CODE FOR FLOATING POINT AST
;CODE FOR RECEIVE DATA AST
;CODE FOR RECEIVE BY REFERENCE AST
;CODE FOR PARITY ERROR AST
;CODE FOR REQUESTED EXIT AST
;CODE FOR POWER FAIL AST
;CODE FOR CLI COMMAND ARRIVAL AST
```

```
A.BYT:'L' .BLKW 1
```

```
A.AST:'L' .BLKW 1
```

```
A.NPR:'L' .BLKW 1
```

```
A.PRM:'L' .BLKW 1
```

```
AS.FPA='B'1
```

```
AS.RCA='B'2
```

```
AS.RRA='B'3
```

```
AS.PEA='B'4
```

```
AS.REA='B'5
```

```
AS.PFA='B'6
```

```
AS.CAA='B'7
```

```
; BIT VALUES IN A.PRM+5
```

```
;
```

```
AF.XCC='B'1
```

```
AF.NOT='B'2
```

```
AF.OOB='B'4
```

```
AF.AST='B'10
```

```
AF.ESQ='B'20
```

```
AF.LCK='B'40
```

```
AF.QUE='B'100
```

```
AF.MDE='B'200
```

```
;ATTACHED FOR ALL BUT CONTROL-C (TF.XCC)
;ATTACHED FOR ALL NOTIFICATION (TF.NOT)
;ACB IS FOR OUT-OF-BAND AST
;ACB HANDLES UNSOL. INPUT CHAR AST'S (TF.AST)
;ATTACHED FOR ESCAPE SEQUENCES (TF.ESQ)
;ACB IS LOCKED
;ACB IS QUEUED
;ACB IS MARKED FOR DELETE
```


PKTDF\$ (Cont.)

```

;
; ABORTER SUBCODES FOR ABORT AST (AS.REA) TO BE RETURNED ON USER'S STACK
;
AB.NPV='B'1                ;ABORTER IS NONPRIVILEGED (1=YES)
AB.TYP='B'2                ;ABORT FROM DIRECTIVE (0=YES)
                            ;ABORT FROM CLI COMMAND (1=YES)
A.PLGH='B'70              ;SIZE OF PARITY ERROR AST CONTROL BLOCK
A.DUCB='B'10              ;UCB OF TERM ISSUING DEBUG COMMAND
A.DLGH='B'10.             ;LENGTH OF DEBUG (AK.TBT) AST BLOCK

;      KERNEL AST CONTROL CODES (A.CBL)

AK.BUF='B'200              ;BUFFERED I/O COMPLETION
                            ;THIS CODE MUST BE 200 UNTIL ALL
                            ;REFERENCES IN TTDRV ARE FIXED
AK.OCB='B'201              ;OFFSPRING TASK EXIT
AK.GBI='B'202              ;SEGMENTED BUFFERED I/O COMPLETION
AK.TBT='B'203              ;TASK FORCE T-BIT TRAP (DEBUG CMD)
AK.DIO='B'204              ;DELAYED I/O COMPLETION
AK.GGF='B'205              ;GRP. GBL. RUNDWN
;+
; BIT DEFINITIONS FOR THE GET/SET INFORMATION DIRECTIVE.
;-

SF.PRV='B'100000           ;FUNCTION IS PRIVILEGED
SF.IN='B' 40000            ;FUNCTION IS AN INPUT FUNCTION

;+
; GROUP GLOBAL EVENT FLAG BLOCK OFFSETS
;-

.=0
G.LNK:'L'.BLKW 1           ;LINK WORD
G.GRP:'L'.BLKB 1           ;GROUP NUMBER
G.STAT:'L'.BLKB 1          ;STATUS BYTE
G.CNT:'L'.BLKW 1           ;ACCESS COUNT
G.EFLG:'L'.BLKW 2          ;EVENT FLAGS

G.LGTH='B'.                ;LENGTH OF GROUP GLOBAL EVENT FLAG
                            ;BLOCK

GS.DEL='B'1                ;STATUS BIT -- MARKED FOR DELETE

;+
; EXECUTIVE POOL MONITOR CONTROL FLAGS
;-

; $POLST IS THE SYNCHRONIZATION WORD BETWEEN THE EXEC AND POOL MONITOR

PC.HIH='B'1                ;HIGH POOL LIMIT CROSSED (1=YES)
PC.LOW='B'2                ;LOW POOL LIMIT CROSSED (1=YES)
PC.ALF='B'4                ;POOL ALLOCATION FAILURE (1=YES)
PC.XIT='B'200              ;FORCE POOL MONITOR TASK TO EXIT (MUST
                            ;BE COUPLED WITH SETTING FE.MXT IN THE
                            ;FEATURE MASK)
PC.NRM='B'PC.HIH*400        ;POOL TASK INHIBIT BIT FOR HIGH POOL
PC.ALM='B'PC.LOW*400        ;POOL TASK INHIBIT BIT FOR LOW POOL

```

PKTDF\$ (Cont.)

```
; $POLFL IS THE POOL USAGE CONTROL WORD
```

```
PF.INS='B'40          ;REJECT NONPRIVILEGED INS/RUN/REM
PF.LOG='B'100         ;NONPRIVILEGED LOGINS ARE DISABLED
PF.REQ='B'200         ;STALL REQUEST OF NONPRIV. TASKS

PF.ALL='B'177777      ;TAKE ALL POSSIBLE ACTIONS TO SAVE POOL
```

```
;+
; OFFSPRING CONTROL BLOCK DEFINITIONS
;
; SOME POSITIONAL DEPENDENCIES ARE DEPENDED ON BETWEEN THE OCB AND THE
; AST BLOCK IN THE ROUTINE $FINXT IN THE MODULE SYSXT.
;-
```

```
.=0
O.LNK:'L'.BLKW 1      ;OCB LINK WORD
O.MCRL:'L'.BLKW 1     ;ADDRESS OF MCR COMMAND LINE
O.PTCB:'L'.BLKW 1     ;PARENT TCB ADDRESS
O.AST:'L'.BLKW 1      ;EXIT AST ADDRESS
O.EFN:'L'.BLKW 1      ;EXIT EVENT FLAG
O.ESB:'L'.BLKW 1      ;EXIT STATUS BLOCK VIRTUAL ADDRESS
O.STAT:'L'.BLKW 8     ;EXIT STATUS BUFFER
O.LGTH='B'.           ;LENGTH OF OCB
```

```
;+
; I/O PACKET OFFSET DEFINITIONS
;-
```

```
.ASECT
```

```
.=0
I.LNK:'L'.BLKW 1      ;I/O QUEUE THREAD WORD
I.PRI:'L'.BLKB 1      ;REQUEST PRIORITY
I.EFN:'L'.BLKB 1      ;EVENT FLAG NUMBER
I.TCB:'L'.BLKW 1      ;TCB ADDRESS OF REQUESTOR
I.LN2:'L'.BLKW 1      ;POINTER TO SECOND LUN WORD
I.UCB:'L'.BLKW 1      ;POINTER TO UNIT CONTROL BLOCK
I.FCN:'L'.BLKW 1      ;I/O FUNCTION CODE
I.IOSB:'L'.BLKW 1     ;VIRTUAL ADDRESS OF I/O STATUS BLOCK
                  .BLKW 1 ;I/O STATUS BLOCK RELOCATON BIAS
                  .BLKW 1 ;I/O STATUS BLOCK ADDRESS
I.AST:'L'.BLKW 1      ;AST SERVICE ROUTINE ADDRESS
I.PRM:'L'.BLKW 1      ;RESERVED FOR MAPPING PARAMETER #1
                  .BLKW 6 ;PARAMETERS 1 TO 6
                  .BLKW 1 ;USER MODE DIAGNOSTIC PARAMETER WORD
```

```
;
; FOLLOWING ARE DEFINITIONS FOR FLAG BITS IN I.PRM+11
; (DSA DRIVERS INTERNAL USE ONLY)
;
```

```
IP.FAK='B' 20        ;IOP IS PSEUDO IOP
IP.ABO='B' 40        ;(MUDRV)ABORT COMMAND MUST BE ISSUED FOR IOP
IP.PND='B' 100       ;(MUDRV)ABORT COMMAND WAS ISSUED FOR IOP
IP.UMR='B'200        ;A UMR WAIT BLOCK IS IN USE FOR THIS I/O
```


PKTDF\$ (Cont.)

```

I.ATTL='B'.
;MINIMUM LENGTH OF I/O PACKET (USED BY
;FILE SYSTEM TO CALCULATE MAXIMUM
;NUMBER OF ATTRIBUTES)
I.AADA:'L' .BLKW 2
;STORAGE FOR ATT DESCR PTRS WITH I/O
I.LGTH='B'.
;LENGTH OF I/O REQUEST CONTROL BLOCK
I.ATRL='B'6*8.
;LENGTH OF FILE SYSTEM ATTRIBUTE BLOCK

;
; DEFINE OFFSETS IN I/O PACKET EXTENSION (IOPX)
;
      .ASECT
.=      0

I.XLNK:'L' .BLKW 1
;LINK WORD
I.XIOP:'L' .BLKW 1
;I/O PACKET ADDRESS
I.XTCB:'L' .BLKW 1
;TCB ADDRESS OF REQUESTING TASK
I.XMOD:'L' .BLKW 2
;MODIFIER WORDS (NOTE: 2ND WORD MUST BE
;SPECIFIED AND MUST BE ZERO.)
I.XRBF:'L' .BLKW 2
;READ DATA BUFFER ADDRESS APR BIAS
;READ DATA BUFFER VIRTUAL ADDRESS
I.XRBL:'L' .BLKW 1
;READ DATA BUFFER LENGTH
I.XTMO:'L' .BLKW 1
;READ TIME-OUT INTERVAL
I.XPBF:'L' .BLKW 2
;PROMPT BUFFER ADDRESS APR BIAS
;PROMPT BUFFER VIRTUAL ADDRESS
I.XPBL:'L' .BLKW 1
;PROMPT BUFFER LENGTH
I.XPBV:'L' .BLKW 1
;PROMPT BUFFER VERTICAL FORMS CONTROL
I.XTTB:'L' .BLKW 2
;TERMINATOR TABLE ADDRESS APR BIAS
;TERMINATOR TABLE VIRTUAL ADDRESS
I.XTTL:'L' .BLKW 1
;TERMINATOR TABLE LENGTH
I.XDBF:'L' .BLKW 2
;DEFAULT INPUT BUFFER ADDRESS APR BIAS
;DEFAULT INPUT BUFFER VIRTUAL ADDRESS
I.XDBL:'L' .BLKW 1
;DEFAULT INPUT BUFFER LENGTH

;+
; CLI PARSER BLOCK (CPB) DEFINITIONS
;-

.=0

C.PTCB:'L' .BLKW 1
;ADDRESS OF CLI'S TCB
C.PNAM:'L' .BLKW 2
;CLI NAME
C.PSTS:'L' .BLKW 1
;STATUS MASK
C.PDPL:'L' .BLKB 1
;LENGTH OF DEFAULT PROMPT
C.PCPL:'L' .BLKB 1
;LENGTH O CNTRL/C PROMPT
C.PRMT:'L'
;START OF PROMPT STRINGS. DEFAULT
;IS CONCATENATED WITH CONTROL C PROMPT

;
; STATUS BIT DEFINITIONS
;

CP.NUL='B'1
;PASS EMPTY COMMANDS TO CLI
CP.MSG='B'2
;CLI DESIRES SYSTEM MESSAGES
CP.LGO='B'4
;CLI WANTS COMMANDS FROM LOGGED OFF TTYS
CP.DSB='B'10
;CLI IS DISABLED
CP.PRIV='B'20
;USER MUST BE PRIV TO SET TTY TO THIS CLI
CP.SGL='B'40
;DON'T HANDLE CONTINUATIONS (M-PLUS ONLY)
CP.NIO='B'100
;MCR..., HEL, BYE DO NO I/O TO TTY
;HEL, BYE DO NOT SET CLI ETC.

```

PKTDF\$ (Cont.)

```

CP.RST='B'200                ;ABILITY TO SET TO THIS CLI IS RESTRICTED
                              ;TO THE CLI ITSELF
CP.EXT='B'400                ;PASS TASK EXIT PROMPT REQUESTS TO CLI
CP.POL='B'1000               ;CLI TCB IS IN SECONDARY POOL
CP.CTC='B'2000               ;^C NOTIFICATION PACKETS ARE WANTED

;+
; SECONDARY POOL COMMAND BUFFER BLOCKS
;-

.=0
C.CLK:'L' .BLKW 1            ;LINK WORD
C.CTCB:'L' .BLKW 1           ;TCB ADDRESS OF TASK TO RECEIVE COMMAND
C.CUCB:'L' .BLKW 1           ;UCB ADDRESS OF RESPONSIBLE TERMINAL
C.CCT:'L' .BLKW 1            ;CHARACTER COUNT, EXCLUDING TRAILING CR
C.CSTS:'L' .BLKW 1           ;STATUS MASK
C.CMCD:'L' .BLKW 1           ;SYSTEM MESSAGE CODE
C.CSO:'L' .BLKW 1            ;STARTING OFFSET OF VALID COMMAND TEXT
C.CTR:'L' .BLKB 1            ;TERMINATOR CHARACTER
C.CBLK:'L' .BLKB 1           ;SIZE OF PACKET IN SEC POOL (32 WD.) BLOCKS
C.CTXT:'L' .BLKB 1           ;COMMAND TEXT, FOLLOWED BY CR

;+
; STATUS BITS FOR COMMAND BLOCKS
;-

CC.MCR='B'1                  ;FORCE COMMAND TO MCR
CC.PRM='B'2                  ;ISSUE DEFAULT PROMPT
CC.EXT='B'4                  ;TASK EXIT PROMPT REQUEST
CC.KIL='B'10                 ;DELETE ALL CONTINUATION PIECES FROM THIS TTY
CC.CLI='B'20                 ;COMMAND TO BE RETREIVED BY GCCIS ONLY
CC.MSG='B'40                 ;PACKET CONTAINS SYSTEM MESSAGE TO CLI
CC.TTD='B'100               ;COMMAND CAME FROM TTDRV
CC.CTC='B'200               ;^C NOTIFICATION PACKET

; IDENTIFIER CODES FOR SYSTEM TO CLI MESSAGES
;
; CODES 0-127. ARE RESERVED FOR USE BY DIGITAL
; CODES 128.-255. ARE RESERVED FOR USE BY CUSTOMERS
;
CM.INE='B'1                  ;CLI INITIALIZED ENABLED
CM.IND='B'2                  ;CLI INITIALIZED DISABLED
CM.CEN='B'3                  ;CLI ENABLED
CM.CDS='B'4                  ;CLI DISABLED
CM.ELM='B'5                  ;CLI BEING ELIMINATED
CM.EXT='B'6                  ;CLI MUST EXIT IMMEDIATELY
CM.LKT='B'7                  ;NEW TERMINAL LINKED TO CLI
CM.RMT='B'8                  ;TERMINAL REMOVED FROM CLI
CM.MSG='B'9                  ;GENERAL MESSAGE TO CLI

;+
; ANCILLARY CONTROL BLOCK (ACB) DEFINITIONS
;-

.=0
A.REL:'L' .BLKW 1            ;ACD RELOCATION BIAS
A.DIS:'L' .BLKW 1            ;ACD DISPATCH TABLE POINTER
A.MAS:'L' .BLKW 2            ;ACD FUNCTION MASK WORDS
A.NUM:'L' .BLKB 1            ;ACD IDENTIFICATION NUMBER
A.FLEN:'L' .BLKB 1           ;LENGTH IN BYTES OF FULL ACB

```


PKTDF\$ (Cont.)

```

A.LIN:'L' .BLKW 1      ;ACD LINK WORD
A.ACC:'L' .BLKB 1      ;ACD ACCESS COUNT
A.STA:'L' .BLKB 1      ;ACD STATUS BYTE
A.PLEN='B' .          ;LENGTH IN BYTES OF PROTOTYPE ACB
;
.=A.LIN                ;FULL ACB OVERLAPS PROTOTYPE ACB
A.IMAP:'L' .BLKW 1      ;ACD INTERRUPT BUFFER RELOCATION BIAS
A.IBUF:'L' .BLKW 1      ;ACD INTERRUPT BUFFER ADDRESS
A.ILEN:'L' .BLKW 1      ;ACD INTERRUPT BUFFER LENGTH
A.SMAP:'L' .BLKW 1      ;ACD SYSTEM STATE BUFFER RELOCATION BIAS
A.SBUF:'L' .BLKW 1      ;ACD SYSTEM STATE BUFFER ADDRESS
A.SLEN:'L' .BLKW 1      ;ACD SYSTEM STATE BUFFER LENGTH
A.IOS:'L' .BLKW 2       ;ACD I/O STATUS
A.RES='B' .            ;START OF ACB RESERVED FOR USE BY THE ACD
;
; DEFINE THE FLAG VALUES IN THE OFFSET U.AFLG
;
UA.ACC='B'1            ;ACCEPT THIS CHARACTER
UA.PRO='B'2            ;PROCESS THIS CHARACTER
UA.ECH='B'4            ;ECHO THIS CHARACTER
UA.TYP='B'10           ;FORCE THIS CHARACTER INTO TYPEAHEAD
UA.SPE='B'20           ;THIS CHARACTER HAS A SPECIAL ECHO
UA.PUT='B'40           ;PUT THIS CHARACTER IN THE INPUT BUFFER
UA.CAL='B'100          ;CALL THE ACD BACK AFTER THE TRANSFER
UA.COM='B'200          ;COMPLETE THE INPUT REQUEST
;
UA.ALL='B'400           ;ALLOW PROCESSING OF THIS I/O REQUEST
UA.TRN='B'1000         ;TRANSLATE CHARACTERS FROM OUTPUT QIO
UA.TRA='B'2000         ;TRANSFER CHARACTERS WHEN I/O COMPLETES
;
; DEFINE THE ACD ENTRY POINTS (OFFSETS INTO THE DISPATCH TABLE)
;
.=0
A.ACCE:'L' .BLKW 1      ;I/O REQUEST ACCEPTANCE ENTRY POINT
A.DEQU:'L' .BLKW 1      ;I/O REQUEST DEQUEUE ENTRY POINT
A.POWE:'L' .BLKW 1      ;POWER FAILURE ENTRY POINT
A.INPU:'L' .BLKW 1      ;INPUT COMPLETION ENTRY POINT
A.OUTP:'L' .BLKW 1      ;OUTPUT COMPLETION ENTRY POINT
A.CONN:'L' .BLKW 1      ;CONNECTION ENTRY POINT
A.DISC:'L' .BLKW 1      ;DISCONNECTION ENTRY POINT
A.RECE:'L' .BLKW 1      ;INPUT CHARACTER RECEPTION ENTRY POINT
A.PROC:'L' .BLKW 1      ;INPUT CHARACTER PROCESSING ENTRY POINT
A.TRAN:'L' .BLKW 1      ;OUTPUT QIO CHARACTER TRANSLATION ENTRY POINT
A.CALL:'L' .BLKW 1      ;CALL ACD BACK AFTER TRANSFER ENTRY POINT
;
; DEFINE THE STATUS BITS IN A.STA OF THE PROTOTYPE ACB
;
AS.DLT='B'1            ;ACD IS MARKED FOR DELETE
AS.DIS='B'2            ;ACD IS DISABLED
      .PSECT

      .MACRO PKTDF$ X,Y,Z
      .ENDM
      .ENDM

```

SCBDFS

```

.MACRO SCBDFS,L,B

;+
; STATUS CONTROL BLOCK
;
; THE STATUS CONTROL BLOCK (SCB) DEFINES THE STATUS OF A DEVICE CONTROLLER.
; THERE IS ONE SCB FOR EACH CONTROLLER IN A SYSTEM. THE SCB IS POINTED TO
; BY UNIT CONTROL BLOCKS. TO EXPAND ON THE TELETYPE EXAMPLE ABOVE, EACH TELE-
; TYPE INTERFACED VIA A DL11-A WOULD HAVE A SCB SINCE EACH DL11-A IS AN IN-
; DEPENDENT INTERFACE UNIT. THE TELETYPES INTERFACED VIA THE DH11 WOULD ALSO
; EACH HAVE AN SCB SINCE THE DH11 IS A SINGLE CONTROLLER BUT MULTIPLEXES MANY
; UNITS IN PARALLEL.
;-

    .IF NB SYSDEF

    .ASECT

    .=0
    S.LHD:'L' .BLKW 2          ;CONTROLLER I/O QUEUE LISTHEAD
    S.URM:'L'                ;REFERENCE LABEL

    .IF DF M$PRO

    .BLKW 1                    ;UNIBUS RUN MASK FOR THE FORK BLOCK

    .ENDC

    S.FRK:'L' .BLKW 1          ;FORK BLOCK LINK WORD
    .BLKW 1                    ;FORK-PC
    .BLKW 1                    ;FORK-R5
    .BLKW 1                    ;FORK-R4

    .IF DF L$SDRV

    S.KS5:'L' .BLKW 1          ;FORK KISAR5

    .ENDC

    S.PKT:'L' .BLKW 1          ;ADDRESS OF CURRENT I/O PACKET
    S.CTM:'L' .BLKB 1          ;CURRENT TIMEOUT COUNT
    S.ITM:'L' .BLKB 1          ;INITIAL TIMEOUT COUNT
    S.STS:'L' .BLKB 1          ;STATUS (0=FREE, NE 0=BUSY)
    S.ST3:'L' .BLKB 1          ;STATUS EXTENSION BYTE
    S.ST2:'L' .BLKW 1          ;STATUS EXTENSION
    S.KRB:'L' .BLKW 1          ;ADDRESS OF KRB
    S.RCNT:'L' .BLKB 1          ;NUMBER OF REGISTERS TO COPY
    S.ROFF:'L' .BLKB 1          ;OFFSET TO FIRST DEV REG TO COPY
    S.EMB:'L' .BLKW 1          ;ERROR MESSAGE BLOCK POINTER
    S.KTB:'L' .BLKW 1          ;START OF MULTI-ACCESS KRBS

    .PSECT

```


SCBDFS\$ (Cont.)

```

;+
; OFFSETS FOR MSCP/TMSCP DRIVER DATA BASES (MUDRV, DUDRV)
;-

S.PORT='B'S.EMB+2          ;FIRST 3 CHAR. OF PORT NAME IN RAD50
S.PBIA='B'S.EMB+4          ;BIAS OF PORT
S.QST='B'S.EMB+6           ;ADDRESS OF QST (MU,DU CONTR. TABLE)
S.BSYU='B'S.EMB+10         ;UNIT ASSOCIATED WITH OLDEST CMD TO CONTR.

        .IFF

;+
; STATUS CONTROL BLOCK STATUS EXTENSION BIT DEFINITIONS
;-

S2.EIP='B'1                ;ERROR IN PROGRESS (1=YES)
S2.ENB='B'2                ;ERROR LOGGING ENABLED (0=YES)
S2.LOG='B'4                ;ERROR LOGGING SUPPORTED (1=YES)
S2.MAD='B'10               ;MULTIACCESS DEVICE (1=YES)
S2.LDS='B'40               ;LOAD SHARING ENABLED (1=YES)
S2.OPT='B'100              ;SUPPORTS SEEK OPTIMIZATION (1=YES)
S2.CON='B'200              ;SCB AND KRB ARE CONTIGUOUS (1=YES)
S2.OP1='B'400              ;THESE TWO BITS DEFINE THE OPTIMIZATION
S2.OP2='B'1000             ;METHOD.
                             ;OP2,OP1=0,0 INDICATES NEAREST CYLINDER
                             ;OP2,OP1=0,1 INDICATES ELEVATOR
                             ;OP2,OP1=1,0 INDICATES C-SCAN
                             ;OP2,OP1=1,1 RESERVED
S2.ACT='B'2000             ;DRIVER HAS OPERATION OUTSTANDING (1=YES)
S2.XHR='B'4000             ;EXTERNAL HEADER AND NEW I.LN2 SUPPORT
S2.KRQ='B'10000           ;SCB IS QUEUED IN CONTROLLER REQUEST QUEUE

;+
; STATUS CONTROL BLOCK STATUS EXTENSION (S.ST3) DEFINITIONS
;-

S3.DRL='B'1                ;MULTI-ACCESS DRIVE IN RELEASED STATE (1=YES)
S3.NRL='B'2                ;DRIVER SHOULDN'T RLS MULTI-ACCESS DRIVE (1=YES)
S3.SIP='B'4                ;SEEK IN PROGRESS (1=YES)
S3.ATN='B'10               ;DRIVER MUST CLEAR ATTENTION BIT (1=YES)
S3.SLV='B'20               ;DEVICE USES SLAVE UNITS (1=YES)
S3.SPA='B'40               ;PORT 'A' SPINNING UP
S3.SPB='B'100              ;PORT 'B' SPINNING UP
S3.OPT='B'200              ;SEEK OPTIMIZATION ENABLED (1=YES)
S3.SPU='B'S3.SPA!S3.SPB    ;.OR. OF PORT SPINUP BITS

;+
; KRB ADDRESS TABLE (S.KTB) PORT OFFLINE FROM THIS SCB FLAG.
;-

KP.OFL='B'1                ;KRB ADDRESS POINTS TO OFFLINE PORT (1=YES)

;+
; MAPPING ASSIGNMENT BLOCK (FOR UNIBUS MAPPING REGISTER ASSIGNMENT)
;-

```

SCBDF\$ (Cont.)

```

      .ASECT
.=0
M.LNK:'L' .BLKW 1      ;LINK WORD
M.UMRA:'L' .BLKW 1      ;ADDRESS OF FIRST ASSIGNED UMR
M.UMRN:'L' .BLKW 1      ;NUMBER OF UMR'S ASSIGNED * 4
M.UMVL:'L' .BLKW 1      ;LOW 16 BITS MAPPED BY 1ST ASSIGNED UMR
M.UMVH:'L' .BLKB 1      ;HIGH 2 BITS MAPPED IN BITS 4 AND 5
M.BFVH:'L' .BLKB 1      ;HIGH 6 BITS OF PHYSICAL BUFFER ADDRESS
M.BFVL:'L' .BLKW 1      ;LOW 16 BITS OF PHYSICAL BUFFER ADDRESS
M.LGTH='B' .          ;LENGTH OF MAPPING ASSIGNMENT BLOCK

      .ENDC

      .PSECT

      .MACRO SCBDF$,X,Y,Z
      .ENDM
      .ENDM

```


SHDDF\$

```

.MACRO SHDDF$,L,B

;
; FIRST, WE MUST DEFINE THE I/O PACKET DEFINITIONS, SINCE WE
; USE THEM IN OUR DEFINITIONS.
;

PKTDF$                ;DEFINE I/O PACKET DEFINITIONS

;+
; SHADOW RECORDING LINKAGE BLOCK (UMB)
;
; THE UMB LINKS TOGETHER TWO UCB'S AS A SHADOW SET. ONE IS THE
; PRIMARY UCB, THE OTHER THE SECONDARY UCB. THE EXISTANCE OF A
; UMB SIGNALS THAT SHADOW RECORDING IS ENABLED ON A PARTICULAR
; UCB.
;-

.ASECT

.=0
M.LNK:'L' .BLKW 1      ;LINKAGE OF ALL UMB'S IN THE SYSTEM
M.LHD:'L' .BLKW 1      ;LISTHEAD OF ALL ML NODES FOR THIS SET
M.UCBS:'L' .BLKW 2      ;PRIMARY AND SECONDARY UCB ADDRESSES
M.STS:'L' .BLKW 1      ;STATUS WORD
M.LBN:'L' .BLKB 1      ;HIGH ORDER BYTE OF FENCE
                     .BLKB 1 ;UNUSED BYTE (MAYBE STATUS?)
                     .BLKW 1 ;LOW ORDER WORD OF FENCE
M.LGH=.

;+
; UMB STATUS BIT DEFINITIONS
;-

.PSECT

MS.MDA'B'=1            ;UMB MARKED FOR DEALLOCATION (1=YES)
MS.CHP'B'=2            ;CATCHUP IN PROGRESS (1=YES)

;+
; DEFINE THE OFFSETS FOR THE ML NODE, LINKED OFF OF THE UMB
; THROUGH CELL M.LHD. THIS NODE CONTAINS THE SECONDARY I/O
; PACKET, AND DOUBLES AS THE ERROR PACKET TO THE ERROR MESSAGE
; TASK.
;-

.ASECT

.=0
ML.LNK:'L' .BLKW 1      ;LINKAGE OF ALL ML NODES ON UMB
ML.LEN:'L' .BLKB 1      ;LENGTH OF ML NODE FOR DEALLOCATION
ML.TYP:'L' .BLKB 1      ;TYPE OF ML NODE FOR ERROR TASK
ML.DNC:'L' .BLKB 1      ;DONE COUNT OF PACKETS
                     .BLKB 1 ;UNUSED
ML.PRI:'L' .BLKW 1      ;PRIMARY I/O PACKET ADDRESS
ML.PKT:'L' .BLKB 1.LGTH ;SECONDARY I/O PACKET
ML.LGH=.

```

SHDDF\$ (Cont.)

```
;+
; ML NODE TYPE CODES
;-
```

```
.PSECT
```

```
MT.PKT'B'=1                      ;ML NODE IS I/O PACKET TYPE
```

```
;+
; I/O PACKET OFFSET DEFNS FOR USE BY SHADOW RECORDING
;-
```

```
I.R0'B'=I.PRM                      ;STATUS STORAGE FOR R0 STATUS
I.R1'B'=I.PRM+2                    ;STATUS STORAGE FOR R1 STATUS
```

```
;+
; DEFINE THE ERROR MESSAGE POINTERS THAT RESIDE IN THE I/O PACKET.
;-
```

```
.PSECT
```

```
ML.FID'B'=ML.PKT+I.IOSB           ;FILE ID WHICH CONTAINS ERROR
ML.FSEQ'B'=ML.PKT+I.IOSB+2        ;FILE SEQUENCE NUMBER OF FILE IN ERROR
ML.LBN'B'=ML.PKT+I.PRM+10        ;HIGH ORDER LBN OF BLOCK(S) IN ERROR
ML.CNT'B'=ML.PKT+I.PRM+4         ;NUMBER OF BLOCKS IN BAD XFER
ML.TCB'B'=ML.PKT+I.TCB           ;TCB OF TASK WITH BAD REQUEST
ML.SR0'B'=ML.PKT+I.R0            ;R0 OF SECONDARY I/O PACKET
ML.SR1'B'=ML.PKT+I.R1            ;R1 OF SECONDARY I/O PACKET
ML.PR0'B'=ML.PKT+I.PRM+14        ;R0 OF PRIMARY I/O PACKET
ML.PR1'B'=ML.PKT+I.PRM+16        ;R1 OF PRIMARY I/O PACKET
```

```
.MACRO SHDDF$,X,Y,Z
.ENDM
.ENDM
```


TCBDFS

```

.MACRO TCBDFS,L,B

;+
; TASK CONTROL BLOCK OFFSET AND STATUS DEFINITIONS
;
; TASK CONTROL BLOCK
;-

.ASECT
.=0
T.LNK:'L' .BLKW 1          ;UTILITY LINK WORD
T.PRI:'L' .BLKB 1          ;TASK PRIORITY
T.IOC:'L' .BLKB 1          ;I/O PENDING COUNT
T.PCBV:'L' .BLKW 1         ;POINTER TO COMMON PCB VECTOR
T.NAM:'L' .BLKW 2          ;TASK NAME IN RAD50
T.RCVL:'L' .BLKW 2         ;RECEIVE QUEUE LISTHEAD
T.ASTL:'L' .BLKW 2         ;AST QUEUE LISTHEAD
T.EFLG:'L' .BLKW 2         ;TASK LOCAL EVENT FLAGS 1-32
T.UCB:'L' .BLKW 1          ;UCB ADDRESS FOR PSEUDO DEVICE 'TI'
T.TCBL:'L' .BLKW 1         ;TASK LIST THREAD WORD
T.STAT:'L' .BLKW 1         ;FIRST STATUS WORD (BLOCKING BITS)
T.ST2:'L' .BLKW 1          ;SECOND STATUS WORD (STATE BITS)
T.ST3:'L' .BLKW 1          ;THIRD STATUS WORD (ATTRIBUTE BITS)
T.DPRI:'L' .BLKB 1         ;TASK'S DEFAULT PRIORITY
T.LBN:'L' .BLKB 3          ;LBN OF TASK LOAD IMAGE
T.LDV:'L' .BLKW 1          ;UCB ADDRESS OF LOAD DEVICE
T.PCB:'L' .BLKW 1          ;PCB ADDRESS OF TASK PARTITION
T.MXSZ:'L' .BLKW 1         ;MAXIMUM SIZE OF TASK IMAGE (MAPPED ONLY)
T.ACTL:'L' .BLKW 1         ;ADDRESS OF NEXT TASK IN ACTIVE LIST
T.ATT:'L' .BLKW 2          ;ATTACHMENT DESCRIPTOR LISTHEAD
T.ST4:'L' .BLKW 1          ;FOURTH TASK STATUS WORD
T.HDLN:'L' .BLKB 1         ;LENGTH OF HEADER (0 IF HDR IN POOL)
                        .BLKB 1 ;UNUSED
T.GGF:'L' .BLKB 1          ;GROUP GLOBAL USE COUNT FOR TASK
T.TIO:'L' .BLKB 1          ;BUFFERED I/O IN PROGRESS COUNT
T.EFLM:'L' .BLKW 2         ;TASK WAITFOR MASK/ADDRESS
T.TKSZ:'L' .BLKW 1         ;TASK LOAD SIZE IN 32 WD BLOCKS

$$$=.                      ;MARK START OF PLAS AREA

T.OFF:'L' .BLKW 1          ;OFFSET TO TASK IMAGE IN PARTITION
                        .BLKB 1 ;RESERVED
T.SRCT:'L' .BLKB 1         ;SREF WITH EFN COUNT IN ALL RECEIVE QUEUES
T.RRFL:'L' .BLKW 2         ;RECEIVE BY REFERENCE LISTHEAD

.IF NDF P$$LAS

.=$$$                      ;MOVE LC BACK TO START OF PLAS AREA

.ENDC

.IF NB SYSDEF

$$$=.

```

TCBDFS (Cont.)

```

T.CTX: 'L' .BLKW 1          ;POINTER TO CONTEXT BLOCK (DDS)
    .IF NDF N$SDIR
    .=$$$
    .ENDC ; NDF N$SDIR

$$$=.                      ;MARK START OF PARENT/OFFSPRING AREA

T.OCBH: 'L' .BLKW 2        ;OFFSPRING CONTROL BLOCK LISTHEAD
T.RDCT: 'L' .BLKW 1        ;OUTSTANDING OFFSPRING AND VT: COUNT

    .IF NDF P$SOFF
    .=$$$
    .ENDC

T.SAST: 'L' .BLKW 1        ;SPECIFY AST LIST HEAD
$$$=.

T.RRM: 'L' .BLKW 1        ;REQUIRED RUN MASK
T.IRM: 'L' .BLKW 1        ;INITIAL RUN MASK SET UP BY INSTALL
                        ;**** THIS WORD IS NO LONGER NECESSARY
                        ;**** HOWEVER, INSTALL (INSLB), MCR (SPAWN),
                        ;**** AND VMR MUST BE MODIFIED
T.CPU: 'L' .BLKB 1        ;PROCESSOR NUMBER ON WHICH TASK LAST EXECUTED
    .BLKB 1              ;(UNUSED)

    .IF NDF M$SPRO
    .=$$$
    .ENDC

$$$=.

T.ACN: 'L' .BLKW 1        ;POINTER TO ACCOUNTING BLOCK

    .IF NDF A$SCNT
    .=$$$
    .ENDC

$$$=.

T.ISIZ: 'L' .BLKW 1        ;SIZE OF ROOT I SPACE

    .IF NDF U$SDAS

```


TCBDF\$ (Cont.)

```

.=$$$

```

```

.ENDC ; NDF U$SDAS

```

```

T.LGTH='B'.
T.EXT='B'0

```

```

;LENGTH OF TASK CONTROL BLOCK
;LENGTH OF TCB EXTENSION

```

```

.IFF

```

```

;+
; TASK STATUS DEFINITIONS
;
; FIRST STATUS WORD (BLOCKING BITS)
;-

```

```

TS.EXE='B'100000 ;TASK NOT IN EXECUTION (1=YES)
TS.RDN='B'40000 ;I/O RUN DOWN IN PROGRESS (1=YES)
TS.MSG='B'20000 ;ABORT MESSAGE BEING OUTPUT (1=YES)
TS.CIP='B'10000 ;TASK BLOCKED FOR CHECKPOINT IN PROGRESS (1=YES)
TS.RUN='B'4000 ;TASK IS RUNNING ON ANOTHER PROCESSOR (1=YES)
TS.STP='B'1000 ;TASK BLOCKED BY CLI COMMAND
TS.CKR='B'100 ;TASK HAS CKP REQUEST (MP SYSTEM ONLY) (1=YES)
TS.BLC='B'37 ;INCREMENT BLOCKING COUNT MASK

```

```

;+
; TASK BLOCKING STATUS MASK
;-

```

```

TS.BLK='B'177777

```

```

;+
; SECOND STATUS WORD (STATE BITS)
;-

```

```

T2.AST='B'100000 ;AST IN PROGRESS (1=YES)
T2.DST='B'40000 ;AST RECOGNITION DISABLED (1=YES)
T2.CHK='B'20000 ;TASK NOT CHECKPOINTABLE (1=YES)
T2.REX='B'10000 ;REQUESTED EXIT AST SPECIFIED
T2.SEF='B'4000 ;TASK STOPPED FOR EVENT FLAG(S) (1=YES)
T2.SIO='B'1000 ;TASK STOPPED FOR BUFFERED I/O
T2.AFF='B'400 ;TASK IS INSTALLED WITH AFFINITY
T2.HLT='B'200 ;TASK IS BEING HALTED (1=YES)
T2.ABO='B'100 ;TASK MARKED FOR ABORT (1=YES)
T2.STP='B'40 ;SAVED T2.SPN ON AST IN PROGRESS
T2.STP='B'20 ;TASK STOPPED (1=YES)
T2.SPN='B'10 ;SAVED T2.SPN ON AST IN PROGRESS
T2.SPN='B'4 ;TASK SUSPENDED (1=YES)
T2.WFR='B'2 ;SAVED T2.WFR ON AST IN PROGRESS
T2.WFR='B'1 ;TASK IN WAITFOR STATE (1=YES)

```

```

;+
; THIRD STATUS WORD (ATTRIBUTE BITS)
;-

```

```

T3.ACP='B'100000 ;ANCILLARY CONTROL PROCESSOR (1=YES)
T3.PMD='B'40000 ;DUMP TASK ON SYNCHRONOUS ABORT (0=YES)
T3.REM='B'20000 ;REMOVE TASK ON EXIT (1=YES)
T3.PRIV='B'10000 ;TASK IS PRIVILEGED (1=YES)

```

TCBDFS\$ (Cont.)

```

T3.MCR='B'4000      ;TASK REQUESTED AS EXTERNAL MCR FUNCTION (1=YES)
T3.SLV='B'2000      ;TASK IS A SLAVE TASK (1=YES)
T3.CLI='B'1000      ;TASK IS A COMMAND LINE INTERPRETER (1=YES)
T3.RST='B'400       ;TASK IS RESTRICTED (1=YES)
T3.NSD='B'200       ;TASK DOES NOT ALLOW SEND DATA
T3.CAL='B'100       ;TASK HAS CHECKPOINT SPACE IN TASK IMAGE
T3.ROV='B'40        ;TASK HAS RESIDENT OVERLAYS
T3.NET='B'20        ;NETWORK PROTOCOL LEVEL
T3.MPC='B'10        ;MAPPING CHANGE WITH OUTSTANDING I/O (1=YES)
T3.CMD='B'4         ;TASK IS EXECUTING A CLI COMMAND
T3.SWS='B'2         ;RESERVED FOR SOFTWARE SERVICES USE
T3.GFL='B'1         ;GROUP GLOBAL EVENT FLAG LOCK

```

```

;+
; STATUS BIT DEFINITIONS FOR FOURTH STATUS WORD (T.ST4)
;-

```

```

T4.FMP='B'200      ;TASK HAS FAST MAP HDR EXT.
T4.CTC='B'100      ;TASK HAS BEEN PROCESSED BY GIN ^C ABORT
T4.MUT='B'40       ;TASK IS A MULTI-USER TASK
T4.LDD='B'20       ;TASK'S LOAD DEVICE HAS BEEN DISMOUNTED
T4.PRO='B'10       ;TCB IS (OR SHOULD BE) A PROTOTYPE
T4.PRIV='B'4       ;TASK WAS PRIV, BUT HAS CLEARED T3.PRIV
                  ;WITH GIN (MAY RESET WITH GIN IF T4.PRIV SET)
T4.DSP='B'2       ;TASK WAS BUILT FOR USER I/D SPACE
T4.SNC='B'1       ;TASK USES COMMONS FOR SYNCHRONIZATION

```

```

;+
; REQUIRED RUN MASK
;-

```

```

TR.UBT='B'100000   ;UNIBUS RUN T
TR.UBS='B'40000    ;UNIBUS RUN S
TR.UBR='B'20000    ;UNIBUS RUN R
TR.UBP='B'10000    ;UNIBUS RUN P
TR.UBN='B'4000     ;UNIBUS RUN N
TR.UBM='B'2000     ;UNIBUS RUN M
TR.UBL='B'1000     ;UNIBUS RUN L
TR.UBK='B'400      ;UNIBUS RUN K
TR.UBJ='B'200      ;UNIBUS RUN J
TR.UBH='B'100      ;UNIBUS RUN H
TR.UBF='B'40       ;UNIBUS RUN F
TR.UBE='B'20       ;UNIBUS RUN E
TR.CPD='B'10       ;PROCESSOR D
TR.CPC='B'4        ;PROCESSOR C
TR.CPB='B'2        ;PROCESSOR B
TR.CPA='B'1        ;PROCESSOR A

```

```

.ENDC

```

```

.PSECT
.MACRO TCBDFS$ X,Y,Z
.ENDM
.ENDM

```


UCBDF\$

```

.MACRO  UCBDF$,L,B,TTDEF

;+
; UNIT CONTROL BLOCK
;
; THE UNIT CONTROL BLOCK (UCB) DEFINES THE STATUS OF AN INDIVIDUAL DEVICE
; UNIT AND IS THE CONTROL BLOCK THAT IS POINTED TO BY THE FIRST WORD OF
; AN ASSIGNED LUN. THERE IS ONE UCB FOR EACH DEVICE UNIT OF EACH DCB. THE
; UCB'S ASSOCIATED WITH A PARTICULAR DCB ARE CONTIGUOUS IN MEMORY AND ARE
; POINTED TO BY THE DCB. UCB'S ARE VARIABLE LENGTH BETWEEN DCB'S BUT ARE
; OF THE SAME LENGTH FOR A SPECIFIC DCB. TO FINISH THE TELETYPE EXAMPLE
; ABOVE, EACH UNIT ON BOTH INTERFACES WOULD HAVE A UCB.
;-

.ASECT

.=177772

    .IF NB  SYSDEF

    .IF DF A$$CNT
.=.-2
    .ENDC      ;DF A$$CNT

    .IF DF L$$GCL
.=.-2
    .ENDC      ;DF L$$GCL

.=.-2

    .IF DF N$$DIR
.=.-2
    .ENDC      ;DF N$$DIR

U.UAB:'L'

    .IF DF A$$CNT

    .BLKW 1                ;POINTER TO USER ACCOUNT BLOCK

    .ENDC      ;DF A$$CNT

U.LOG:'L'

    .IF DF L$$GCL

    .BLKW 1                ;POINTER TO USER LOGICAL HASH TABLE

    .ENDC      ;DF L$$GCL

U.FPRO:'L'

    .BLKW 1                ;DEFAULT FILE PROTECTION WORD

```

UCBDF\$ (Cont.)

U.CTX: 'L'

.IF DF N\$\$DIR

.BLKW 1 ; POINTER TO TERMINAL CONTEXT BLOCK

.ENDC ; DF N\$\$DIR

.ENDC ; NB SYSDEF

```

U.MUP: 'L' .BLKW 1 ; MULTI-USER PROTECTION WORD
U.LUIC: 'L' .BLKW 1 ; LOGIN UIC - MULTI USER SYSTEMS ONLY
U.OWN: 'L' .BLKW 1 ; OWNING TERMINAL - MULTI USER SYSTEMS ONLY
U.DCB: 'L' .BLKW 1 ; BACK POINTER TO DCB
U.RED: 'L' .BLKW 1 ; POINTER TO REDIRECT UNIT UCB
U.CTL: 'L' .BLKB 1 ; CONTROL PROCESSING FLAGS
U.STS: 'L' .BLKB 1 ; UNIT STATUS
U.UNIT: 'L' .BLKB 1 ; PHYSICAL UNIT NUMBER
U.ST2: 'L' .BLKB 1 ; UNIT STATUS EXTENSION
U.CW1: 'L' .BLKW 1 ; FIRST DEVICE CHARACTERISTICS WORD
U.CW2: 'L' .BLKW 1 ; SECOND DEVICE CHARACTERISTICS WORD
U.CW3: 'L' .BLKW 1 ; THIRD DEVICE CHARACTERISTICS WORD
U.CW4: 'L' .BLKW 1 ; FOURTH DEVICE CHARACTERISTICS WORD
U.SCB: 'L' .BLKW 1 ; POINTER TO SCB
U.ATT: 'L' .BLKW 1 ; TCB ADDRESS OF ATTACHED TASK
U.BUF: 'L' .BLKW 1 ; RELOCATION BIAS OF CURRENT I/O REQUEST
          .BLKW 1 ; BUFFER ADDRESS OF CURRENT I/O REQUEST
U.CNT: 'L' .BLKW 1 ; BYTE COUNT OF CURRENT I/O REQUEST
U.UCBX= 'B' U.CNT+2 ; POINTER TO UCB EXTENSION IN SECONDARY POOL
U.ACP= 'B' U.CNT+4 ; ADDRESS OF TCB OF MOUNTED ACP
U.VCB= 'B' U.CNT+6 ; ADDRESS OF VOLUME CONTROL BLOCK
U.CBF= 'B' U.CNT+2 ; CONTROL BUFFER RELOCATION AND ADDRESS
U.UMB= 'B' U.CNT+10 ; ADDRESS OF UMB FOR SHADOW RECORDING
U.PRM= 'B' U.CNT+12 ; DISK SIZE PARAMETER WORDS
U.ICSR= 'B' U.CNT+16 ; CSR ADDRESS (P/OS)
U.SLT= 'B' U.CNT+20 ; SLOT ADDRESS (P/OS)
U.SPRM= 'B' U.CNT+22 ; 4 WD SAVED I/O PACKET AREA (R$$AMD)
U.UTIL= 'B' U.CNT+16 ; STATE WORD FOR UNIT

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;
; DEFINITIONS FOR U.UTIL BITS
;

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UU.SER = 'B' 1 ; SERIAL MODE
UU.RCT = 'B' 2 ; (DUDRV) RCT IN PROGRESS
UU.AVN = 'B' 4 ; IS WAITING FOR OTHER UNITS TO SPIN DOWN
UU.GUS = 'B' 10 ; UNIT MUST HAVE A GUS COMMAND ISSUED
UU.ONL = 'B' 20 ; UNIT MUST HAVE A ONL COMMAND ISSUED
UU.SPC = 'B' 40 ; SPECIAL ONLINE TRANSITION
UU.ATN = 'B' 100 ; UNIT HAS SENT ATTENTION MESSAGE
UU.RDY = 'B' 200 ; UNIT IS READY
UU.ABO = 'B' 400 ; IF SET, XXCAN SET UU.SER FLAG FOR UNIT
UU.SIO = 'B' 1000 ; THIS UNIT CAN STALL I/O
UU.IOS = 'B' 2000 ; THIS UNIT HAS I/O STALLED
UU.BLK = 'B' 4000 ; THIS UNIT DOESN'T ACCEPT DENSITY SETTINGS

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UCBDFS\$ (Cont.)

```

U.BPKT='B'U.CNT+20      ;UNIT BAD BLOCK REPLACEMENT WAITING LIST
U.MEDI='B'U.BPKT        ;MEDIA IDENTIFIER FOR MU TAPE
U.UC2X='B'U.CNT+24      ;POINTER TO SECOND EXTENSION IN SECONDARY POOL

;
; MAGTAPE DEVICE DEPENDENT UCB OFFSETS
;

U.SNUM='B'U.CNT+10      ;SLAVE UNIT NUMBER
U.FCDE='B'U.CNT+12      ;FUNCTION CODE
U.KRB1='B'U.CNT+14      ;SUBCONTROLLER KRB1 POINTER
;

;
; DEFINE SECONDARY POOL UCB EXTENSION OFFSETS (ERROR LOGGING DEVICES ONLY)
;
.=0
      .BLKW  9.          ;FIXED ACCOUNTING TRANSACTION HEADER
X.NAME:'L' .BLKW 2      ;DRIVE NAME IN RAD50
X.IOC:'L' .BLKW 2       ;I/O COUNT
X.ERSL:'L' .BLKB 1      ;SOFT ERROR LIMIT
X.ERHL:'L' .BLKB 1      ;HARD ERROR LIMIT
X.ERSC:'L' .BLKB 1      ;SOFT ERROR COUNT
X.ERHC:'L' .BLKB 1      ;HARD ERROR COUNT
X.WCNT:'L' .BLKW 2      ;WORDS TRANSFERED COUNT

;
; DEFINE OFFSETS FOR SEEK OPTIMIZATION DEVICES
;

X.CYLC:'L' .BLKW 2      ;CYLINDERS CROSSED COUNT
X.CCYL:'L' .BLKW 1      ;CURRENT CYLINDER
X.FCUR:'L' .BLKB 1      ;CURRENT FAIRNESS COUNT
X.FLIM:'L' .BLKB 1      ;FAIRNESS COUNT LIMIT
X.DSKD:'L' .BLKB 1      ;DISK DIRECTION (HIGH BIT 1=OUT)

X.DNAM:'L' .BLKW 1      ;DEVICE NAME FOR ACCOUNTING
X.UNIT:'L' .BLKB 1      ;UNIT NUMBER FOR ACCOUNTING
X.CSTS:'L' .BLKB 1      ;CACHE STATUS BITS
X.CPCB:'L' .BLKW 1      ;CACHE PARTITION PCB ADDRESS
X.CSBA:'L' .BLKW 1      ;CACHE STATISTICS BUFFER ADDRESS (BIAS)
X.CCED:'L' .BLKW 2      ;CACHE EXTENT DESCRIPTOR LISTHEAD
X.XDAT:'L' .BLKB 1      ;CACHE VIRTUAL EXTENT SIZE
X.XRDA:'L' .BLKB 1      ;CACHE READAHEAD EXTENT SIZE
X.XDIR:'L' .BLKB 1      ;CACHE DIRECTORY EXTENT SIZE
X.XLOG:'L' .BLKB 1      ;CACHE LOGICAL EXTENT SIZE
X.XOVR:'L' .BLKB 1      ;CACHE OVERLAY EXTENT SIZE
      .BLKB 1          ;RESERVED
X.LGTH='B' .            ;LENGTH OF THE UCB EXTENSION
X.DFFL='B'10.          ;DEFAULT FAIRNESS COUNT LIMIT
X.DFSL='B'8.           ;DEFAULT SOFT ERROR LIMIT
X.DEHL='B'5.           ;DEFAULT HARD ERROR LIMIT

;
; CACHE STATUS BITS IN X.CSTS
;

```

UCBDF\$ (Cont.)

```

XC.ENA='B'200          ;AUTOCACHE ENABLED (1=YES)
XC.ACT='B'100          ;CACHE ACTIVE FOR DEVICE (1=YES)
XC.DIR='B'020          ;CACHE DIRECTORY REQUESTS (1=YES)
XC.OVR='B'010          ;CACHE OVERLAY REQUESTS (1=YES)
XC.DAT='B'004          ;CACHE VIRTUAL REQUESTS (1=YES)
XC.LOG='B'002          ;CACHE LOGICAL REQUESTS (1=YES)
XC.RDA='B'001          ;CACHE VIRTUAL READ AHEAD (1=YES)

;
; DEFINE CACHE MAXIMUM AND DEFAULT EXTENT SIZES
;

XX.MAX='B'15.          ; MAXIMUM EXTENT SIZE
XX.DAT='B'5.           ; DEFAULT VIRTUAL EXTENT SIZE
XX.RDA='B'5.           ; DEFAULT READAHEAD EXTENT SIZE
XX.DIR='B'1.           ; DEFAULT DIRECTORY EXTENT SIZE
XX.LOG='B'1.           ; DEFAULT LOGICAL EXTENT SIZE
XX.OVR='B'4.           ; DEFAULT OVERLAY EXTENT SIZE

;
; DEFINE OFFSETS FOR DISK MSCP CONTROLLERS (SECOND UCB EXTENSION)
;

;
; CHARACTERISTICS OBTAINED FROM "GET UNIT STATUS" END PACKETS
;

.=0
X.MLUN:'L'.BLKW 1      ;MULTI-UNIT CODE
X.UNFL:'L'.BLKW 1      ;UNIT FLAGS
                      ;RESERVED
X.UNTI:'L'.BLKW 4      ;UNIT IDENTIFIER
X.MEDI:'L'.BLKW 2      ;MEDIA IDENTIFIER
X.SHUN:'L'.BLKW 1      ;SHADOW UNIT
X.SHST:'L'.BLKW 1      ;SHADOW UNIT STATUS
X.TRCK:'L'.BLKW 1      ;UNIT TRACK SIZE
X.GRP:'L'.BLKW 1       ;UNIT GROUP SIZE
X.CYL:'L'.BLKW 1       ;UNIT CYLINDER SIZE
X.USVR:'L'.BLKB 1      ;UNIT SOFTWARE VERSION
X.UHVR:'L'.BLKB 1      ;UNIT HARDWARE VERSION
X.RCTS:'L'.BLKW 1      ;UNIT RCT TABLE SIZE
X.RBNS:'L'.BLKB 1      ;UNIT RBN 'S / TRACK
X.RCTC:'L'.BLKB 1      ;UNIT RCT COPIES
;
; CHARACTERISTICS OBTAINED FROM "ONLINE" OR "SET UNIT CHARACTERISTICS" END
; PACKETS
;
X.UNSZ:'L'.BLKW 2      ;UNIT SIZE
X.VSER:'L'.BLKW 2      ;VOLUME SERIAL NUMBER

X.DUSZ='B'.            ;SIZE OF DISK MSCP CONTROLLER UCB EXTENTION

      .IF NB TTDEF

;
; TERMINAL DRIVER DEFINITIONS
;

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UCBDF\$ (Cont.)

```

.=U.BUF
U.TAPR:'L' .BLKW 1
U.TUX:'L' .BLKW 1
U.TSTA:'L' .BLKW 4
U.UIC:'L' .BLKW 1
U.TFRQ:'L' .BLKW 1
U.TFLK:'L' .BLKW 1
U.TCHP:'L' .BLKW 1
U.TCVP:'L' .BLKB 1
U.TTYP:'L' .BLKB 1
U.TMTI:'L' .BLKB 1
U.TTAB:'L' .BLKW 1

                .=-2
U.TECO:'L' .BLKB 1

U.TBSZ:'L' .BLKB 1
U.TLPP:'L' .BLKW 1
U.TST5:'L' .BLKW 1
U.TST6:'L' .BLKW 1
U.TIXL:'L' .BLKW 1
U.ACB:'L' .BLKW 1
U.AFLG:'L' .BLKW 1
U.ADMA:'L' .BLKW 1

                .IF DF T$SLTH

;
; LAT Host Support
;

U.LINS:'L' .BLKB 1
U.CREN:'L' .BLKB 1

U.SRVN:'L' .BLKW 1
U.SESN:'L' .BLKB 1
U.SLSZ:'L' .BLKB 1

U.RSBB:'L' .BLKW 1
U.RBHA:'L' .BLKW 1
U.RSDV:'L' .BLKW 1

U.TRLH:'L' .BLKW 1
U.TRSC:'L' .BLKW 1

U.CCBA:'L' .BLKW 1
;
; LINK STATUS WORD IN U.LINS
;
UL.TRS='B'1

;APR VALUE FOR START OF UCBX
;POINTER TO UCB EXTENSION (UCBX)
;STATUS QUADRUPLE-WORD
;DEFAULT UIC
;FORK REQUEST WORD
;FORK LIST LINK WORD
;CURRENT HORIZONTAL POSITION
;CURRENT VERTICAL POSITION
;TERMINAL TYPE
;MODEM TIMER
;IF 0: U.TTAB+1 IS SINGLE-CHARACTER TYPE-AHEAD
;    BUFFER, CURRENTLY EMPTY
;IF ODD: U.TTAB+1 IS SINGLE-CHARACTER TYPE-AHEAD
;    BUFFER AND HOLDS A CHARACTER
;IF NON-0 AND EVEN: POINTER TO MULTI-CHARACTER
;    TYPE-AHEAD BUFFER
;THE NEXT TWO OFFSETS OVERLAP U.TTAB WHEN THE
;TYPEAHEAD BUFFER IS IN SECONDARY POOL
;ECHO BUFFER FOR DMA OPERATIONS WHEN UCBX IS
;IN SECONDARY POOL AND THUS NOT MAPPED BY A UMR
;TYPEAHEAD BUFFER SIZE
;LINES PER PAGE
;ADDITIONAL STATUS BITS
;EXTENDED I/O STATUS WORD
;I/O PACKET EXTENSION LISTHEAD
;ANCILLARY CONTROL DRIVER BLOCK ADDR
;ANCILLARY CONTROL DRIVER FLAGS WORD
;ANCILLARY CONTROL DRIVER DMA BUFFER

;STATUS/CONTROL INFORMATION
;LINK STATUS
;TRANSMIT CREDITS COUNTER
;SERVER/CIRCUIT IDENTIFICATION
;SERVER NUMBER
;SESSION NUMBER
;MAXIMUM SLOT SIZE ON XMT
;PARAMETERS ON RECEIVE DATA
;RECEIVE SLOT BIAS
;RECEIVE SLOT HEADER VIRTUAL
;RECEIVE DATA VIRTUAL
;XMT INTERMEDIATE BUFFER CHAIN
;XMT LISTHEAD ADDRESS
;XMT REMAINED BYTES IN BUFFER
;VIRTUAL CIRCUIT CCB
;CCB ADDRESS (IN POOL)

;1-XMT STOPPED, 0-NOT
;>255 CHAR. FOR SLOT. HOLD IT.

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UCBDF\$ (Cont.)

```

UL.TDA='B'2          ;1-XMT DATA AVAIL, 0-NOT
                      ;DATA IN XMT QUEUE (SET BY PORT)
UL.LST='B'4          ;1-LINE STOPPED, 0-NOT
                      ;LINE STOPPED BY USER (XOFF
                      ;CAME FROM REMOTE TERMINAL)
UL.RDA='B'10         ;1-RCV DATA AVAIL, 0-NOT
                      ;DATA IN RCV QUEUE (SET BY PROC)
UL.ECH='B'20         ;BUFFER ALLOCATION FAILURE
                      ;FOR 1 ECHO CHARACTER
UL.RSS='B'100        ;1-RCV STOPPED, 0-NOT
                      ;RCV STOPPED BY TDRV ON RECEIVE
                      ;IF NO RESOURCES AVAILABLE
UL.LEN='B'200        ;1-LINK ENABLE, 0-NOT
                      ;TOGGLED BY START/STOP LINK CALL
                      .ENDC ; .IF DF T$SLTH
;
; DEFINE BITS IN STATUS WORD 1 (U.TSTA)
;
;
; I N P U T   S T A T U S
;
S1.RST='B'1          ;READ WITH SPECIAL TERMINATORS IN PROGRESS
S1.ESC='B'2          ;ESCAPE SEQUENCE IN PROGRESS
S1.RSP='B'4          ;READ WITH SPECIAL PROCESSING
S1.PTH='B'10         ;PASS THRU IS CURRENTLY ACTIVE
S1.RNE='B'20         ;ECHO SUPPRESSED
S1.TSY='B'40         ;TERMINAL OUTPUT SYNC IS CURRENTLY ENABLED
S1.OBY='B'100        ;OUTPUT BUSY
S1.IBY='B'200        ;INPUT BUSY
S1.DPR='B'400        ;DEFER PROCESSING OF CHAR. IN U.TECB
S1.DEC='B'1000       ;DEFER ECHO OF CHAR. IN U.TECB
S1.IBF='B'2000       ;BUFFERED INPUT IN PROGRESS
S1.DSI='B'4000       ;INPUT PROCESSING DISABLED
S1.RES='B'10000      ;ESC. SEQ PROCESSING IS ENABLED FOR THE CURRENT
                      ; READ
S1.RNF='B'20000      ;READ NO FILTER IS ACTIVE (EDIT CHARACTERS ARE
                      ; DISPLAYED)
S1.TNE='B'40000      ;TERMINATOR NO ECHO
S1.USI='B'100000     ;UNSOLICITED INPUT IN PROGRESS

; DEFINE BITS IN STATUS WORD 2 (U.TSTA+2)
;
;   O U T P U T   S T A T U S
;
S2.RCU='B'1          ;RESTORE CURSOR (MUST = TF.RCU)
S2.WRA='B'6          ;CONTEXT FOR WRAP-AROUND
S2.WRB='B'2          ;LOW BIT IN S2.WRA BIT PATTERN
S2.WAL='B'10         ;WRITE PASS ALL (MUST = TF.WAL)
S2.BRQ='B'20         ;BREAK-THROUGH-WRITE REQUEST IN QUEUE
S2.SRQ='B'40         ;SPECIAL REQUEST IN QUEUE
                      ;(IO.ATT, IO.DET, SF.SMC)
S2.ORQ='B'100        ;OUTPUT REQUEST IN QUEUE (MUST = S1.OBY)
S2.IRQ='B'200        ;INPUT REQUEST IN QUEUE (MUST = S1.IBY)
S2.FLF='B'400        ;FORCE LINEFEED BEFORE NEXT ECHO
S2.ELF='B'1000       ;EAT A LINEFEED (IGNORE A LEADING LF ON OUTPUT)
S2.CR='B'2000        ;TRAILING CR REQUIRED ON OUTPUT
S2.OBF='B'4000       ;BUFFERED OUTPUT IN PROGRESS

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UCBDF\$ (Cont.)

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S2.PCU='B'10000          ;POSITION CURSOR BEFORE WRITE
S2.BEL='B'20000          ;BELL PENDING
S2.CTO='B'40000          ;OUTPUT STOPPED BY CTRL-O 266.
S2.CTS='B'100000         ;OUTPUT STOPPED BY CTRL-S

; DEFINE BITS IN STATUS WORD 3 (U.TSTA+4)
;
;   TERMINAL OPERATION CHARACTERISTICS
;
S3.ACR='B'1              ;WRAP-AROUND (AUTOMATIC CR-LF) REQUIRED
S3.TAB='B'2              ;TYPE-AHEAD BUFFER ALLOCATION REQUESTED
S3.CTC='B'4              ;TERMINAL WANTS CLI TO HAVE ^C NOTIFICATION
S3.RAL='B'10             ;TERMINAL IS IN READ-PASS-ALL MODE
S3.NEC='B'20             ;NO ECHO
S3.TSY='B'40             ;TERMINAL SYNC
S3.8BC='B'100           ;PASS 8 BITS ON INPUT
S3.FDX='B'200           ;LINE IS IN FULL DUPLEX MODE
S3.MHE='B'400           ;NOTIFY ATTACHED TASK OF MODEM HANG-UP
S3.ICE='B'1000          ;INPUT COUNT STATE ENABLED
S3.TME='B'2000          ;TERMINAL MANAGEMENT MODE ENABLED
S3.PTH='B'4000          ;PASS THROUGH REQUESTED
S3.RES='B'10000         ;TASK WANTS ESCAPE SEQUENCES
S3.PPT='B'20000         ;TERMINAL HAS PRINTER PORT
S3.RUB='B'40000         ;RUBOUT SEQUENCE IN PROGRESS (NON-SCOPE)

;
; DEFINE BITS IN STATUS WORD 4 (U.TSTA+6)
;
;   TERMINAL ATTRIBUTE CHARACTERISTICS
;
S4.HFL='B'7              ;HORIZONTAL FILL REQUIREMENT
S4.VFL='B'10             ;VERTICAL FILL REQUIREMENT
S4.HFF='B'20             ;HARDWARE FORM-FEED PRESENT
S4.HHT='B'40             ;HARDWARE HORIZONTAL TAB PRESENT
S4.DLO='B'100           ;DIAL-OUT LINE (IMPLIES U2.RMT)
S4.HSY='B'200           ;HOST/TERMINAL SYNCHRONIZATION ENABLED (1=YES)
S4.ANI='B'400           ;ANSI CRT TERMINAL
S4.AVO='B'1000          ;VT100-FAMILY TERMINAL DISPLAY
S4.BLK='B'2000          ;BLOCK MODE TERMINAL
S4.DEC='B'4000          ;DIGITAL CRT TERMINAL
S4.EDT='B'10000         ;TERMINAL HAS LOCAL EDITING FUNCTIONS
S4.RGS='B'20000         ;TERMINAL SUPPORTS REGIS GRAPHICS
S4.SFC='B'40000         ;TERMINAL SUPPORTS SOFT CHARACTERS (DRCS)
S4.ABD='B'100000        ;AUTO-BAUD SPEED DETECTION ENABLED

;
; DEFINE BITS IN STATUS WORD U.TST5
;
;   ADDITIONAL STATUS CHARACTERISTICS
;
;
S5.SW1='B'1              ;FIRST TERMINAL MANAGEMENT SWITCH
                          ;CHARACTER HAS BEEN SEEN
S5.TMM='B'2              ;TERMINAL IN TERMINAL MANAGEMENT MODE
S5.XOF='B'4              ;SEND AN XOFF AT FIRST OPPORTUNITY
S5.XON='B'10             ;SEND AN XON AT FIRST OPPORTUNITY
S5.HPC='B'14             ;OUTPUT OF HIGH PRIORITY CHARACTERS REQUESTED

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UCBDFS\$ (Cont.)

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S5.HPO='B'20          ;HIGH PRIORITY OUTPUT IN PROGRESS
S5.OXF='B'40          ;XOFF HAS BEEN OUTPUT
S5.ITI='B'100         ;IMMEDIATE TIMEOUT ON INPUT
;
S5.RPO='B'2000        ;READ W/PROMPT OUTPUT IN PROGRESS
S5.VER='B'10000       ;LAST CHAR. IN TYPE-AHEAD BUFFER
                        ;HAS PARITY ERROR
S5.BCC='B'20000       ;LAST CHAR. IN TYPE-AHEAD BUFFER
                        ;HAS FRAMING ERROR
S5.DAO='B'40000       ;LAST CHAR. IN TYPE-AHEAD BUFFER
                        ;HAS DATA OVERRUN ERROR
                        ;NOTE - THE 3 BITS ABOVE MUST CORRESPOND
                        ;TO THE RESPECTIVE ERROR FLAGS IN THE
                        ;HARDWARE RECEIVE BUFFER
S5.ABP='B'100000      ;AUTO-BAUD SPEED DETECTION IN PROGRESS
;
;
; DEFINE BITS IN EXTENDED I/O STATUS WORD U.TST6
;
;
S6.EIO='B'400         ;READ WAS AN EXTENDED I/O
S6.RLU='B'1000        ;READ WITH LOWER CASE TO UPPER CASE CONVERSION
S6.RDI='B'100000      ;READ WITH DEFAULT INPUT
;
;
      .ENDC

;
; VIRTUAL TERMINAL UCB DEFINITIONS
;

.=U.UNIT
U.OCNT:'L'.BLKB 1     ;OFFSPRING WITH THIS AS TI:
.=U.BUF
U.RPKT:'L'.BLKW 1     ;CURRENT OFFSPRING READ I/O PACKET
U.WPKT:'L'.BLKW 1     ;CURRENT OFFSPRING WRITE I/O PACKET
U.IAST:'L'.BLKW 1     ;INPUT AST ROUTINE ADDRESS
U.OAST:'L'.BLKW 1     ;OUTPUT AST ROUTINE ADDRESS
U.AAST:'L'.BLKW 1     ;ATTACH AST ROUTINE ADDRESS

      .IF NB TTDEF

.IIF NE U.AAST+2-U.UIC .ERROR ;ADJACENCY ASSUMED

      .ENDC

.=U.AAST+4
U.PTCB:'L'.BLKW 1     ;PARENT TCB ADDRESS
;
; CONSOLE DRIVER DEFINITIONS
;

.=U.BUF+2
U.CTCB:'L' .BLKW 1     ;ADDRESS OF CONSOLE LOGGER TCB
U.COTQ:'L' .BLKW 2     ;I/O PACKET LIST QUEUE
U.RED2:'L' .BLKW 1     ;REDIRECT UCB ADDRESS

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UCBDF\$ (Cont.)

.PSECT

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;+
; DEVICE TABLE STATUS DEFINITIONS
;
; DEVICE CHARACTERISTICS WORD 1 (U.CW1) DEVICE TYPE DEFINITION BITS.
;-

DV.REC='B'1          ;RECORD ORIENTED DEVICE (1=YES)
DV.CCL='B'2          ;CARRIAGE CONTROL DEVICE (1=YES)
DV.TTY='B'4          ;TERMINAL DEVICE (1=YES)
DV.DIR='B'10         ;FILE STRUCTURED DEVICE (1=YES)
DV.SDI='B'20         ;SINGLE DIRECTORY DEVICE (1=YES)
DV.SQD='B'40         ;SEQUENTIAL DEVICE (1=YES)
DV.MSD='B'100        ;MASS STORAGE DEVICE (1=YES)
DV.UMD='B'200        ;USER MODE DIAGNOSTICS SUPPORTED (1=YES)
DV.MBC='B'400        ;MASSBUS CONTROLLER (11M COMPATIBILITY ONLY)
DV.EXT='B'400        ;UNIT ON EXTENDED 22-BIT UNIBUS CNTROLER (1=YES)
DV.SWL='B'1000       ;UNIT SOFTWARE WRITE LOCKED (1=YES)
DV.ISP='B'2000       ;INPUT SPOOLED DEVICE (1=YES)
DV.OSP='B'4000       ;OUTPUT SPOOLED DEVICE (1=YES)
DV.PSE='B'10000      ;PSEUDO DEVICE (1=YES)
DV.COM='B'20000      ;DEVICE IS MOUNTABLE AS COM CHANNEL (1=YES)
DV.F11='B'40000      ;DEVICE IS MOUNTABLE AS F11 DEVICE (1=YES)
DV.MNT='B'100000     ;DEVICE IS MOUNTABLE (1=YES)

;+
; TERMINAL DEPENDENT CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-

U2.DH1='B'100000     ;UNIT IS A MULTIPLEXER (1=YES)
U2.DJ1='B'40000      ;UNIT IS A DJ11 (1=YES)
U2.RMT='B'20000      ;UNIT IS REMOTE (1=YES)
U2.HFF='B'10000      ;UNIT HANDLES HARDWARE FORM FEEDS (1=YES)
U2.L8S='B'10000      ;OLD NAME FOR U2.HFF
U2.NEC='B'4000       ;DON'T ECHO SOLICITED INPUT (1=YES)
U2.CRT='B'2000       ;UNIT IS A CRT (1=YES)
U2.ESC='B'1000       ;UNIT GENERATES ESCAPE SEQUENCES (1=YES)
U2.LOG='B'400        ;USER LOGGED ON TERMINAL (0=YES)
U2.SLV='B'200        ;UNIT IS A SLAVE TERMINAL (1=YES)
U2.DZ1='B'100        ;UNIT IS A DZ11 (1=YES)
U2.HLD='B'40         ;TERMINAL IS IN HOLD SCREEN MODE (1=YES)
U2.AT.='B'20         ;MCR COMMAND AT. BEING PROCESSED (1=YES)
U2.PRIV='B'10        ;UNIT IS A PRIVILEGED TERMINAL (1=YES)
U2.L3S='B'4          ;UNIT IS A LA30S TERMINAL (1=YES)
U2.VT5='B'2          ;UNIT IS A VT05B TERMINAL (1=YES)
U2.LWC='B'1          ;LOWER CASE TO UPPER CASE CONVERSION (0=YES)

;+
; BIT DEFINITIONS FOR U.MUP
;-

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UCBDF\$ (Cont.)

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UM.OVR='B'1                      ;OVERRIDE CLI INDICATOR
UM.CLI='B'36                      ;CLI INDICATOR BITS
UM.DSB='B'200                    ;TERMINAL DISABLED SINCE CLI ELIMINATED
UM.NBR='B'400                    ;NO BROADCAST
UM.CNT='B'1000                  ;CONTINUATION LINE IN PROGRESS
UM.CMD='B'2000                  ;COMMAND IN PROGRESS
UM.SER='B'4000                  ;SERIAL COMMAND RECOGNITION ENABLED
UM.KIL='B'10000                 ;TTDRV SHOULD SEND KILL PKT ON CNTRL/C

;+
; RH11-RS03/RS04 CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-
U2.R04='B'100000                ;UNIT IS A RS04 (1=YES)

;+
; RH11-TU16 CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-
U2.7CH='B'10000                ;UNIT IS A 7 CHANNEL DRIVE (1=YES)

;+
; TERMINAL DEPENDENT CHARACTERISTICS WORD 3 (U.CW3) BIT DEFINITIONS
;-
U3.UPC='B'20000                 ;UPCASE OUTPUT FLAG
U3.PAR='B'40000                 ;PARITY GENERATION AND CHECKING
U3.OPA='B'100000                ;PARITY SENSE (1=ODD PARITY)

;+
; VIRTUAL TERMINAL 3RD CHARACTERISTICS WORD DEFINITIONS
;-
U3.FDX='B'1                     ;FULL DUPLEX MODE (1=YES)
U3.DBF='B'2                     ;INTERMEDIATE BUFFERING DISABLED (1=YES)
U3.RPR='B'4                     ;READ W/PROMPT IN PROGRESS (1=YES)

;+
; TERMINAL DEPENDENT CHARACTERISTICS WORD 4 (U.CW4) BIT DEFINITIONS
;-
U4.CR='B'100                    ;LOOK FOR CARRIAGE RETURN

;+
; UNIT CONTROL PROCESSING FLAG DEFINITIONS
;-
UC.ALG='B'200                   ;BYTE ALIGNMENT ALLOWED (1=NO)
UC.NPR='B'100                   ;DEVICE IS AN NPR DEVICE (1=YES)
UC.QUE='B'40                    ;CALL DRIVER BEFORE QUEUING (1=YES)
UC.PWF='B'20                    ;CALL DRIVER AT POWERFAIL ALWAYS (1=YES)
UC.ATT='B'10                    ;CALL DRIVER ON ATTACH/DETACH (1=YES)
UC.KIL='B'4                     ;CALL DRIVER AT I/O KILL ALWAYS (1=YES)
UC.LGH='B'3                     ;TRANSFER LENGTH MASK BITS

;+
; UNIT STATUS BIT DEFINITIONS
;-

```


UCBDF\$ (Cont.)

```

US.BSY='B'200          ;UNIT IS BUSY (1=YES)
US.MNT='B'100          ;UNIT IS MOUNTED (0=YES)
US.FOR='B'40           ;UNIT IS MOUNTED AS FOREIGN VOLUME (1=YES)
US.MDM='B'20           ;UNIT IS MARKED FOR DISMOUNT (1=YES)
US.PWF='B'10           ;POWERFAIL OCCURED (1=YES).

;+
; CARD READER DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.ABO='B'1            ;UNIT IS MARKED FOR ABORT IF NOT READY (1=YES)
US.MDE='B'2            ;UNIT IS IN 029 TRANSLATION NODE (1=YES)

;+
; FILES-11 DEPENDENT UNIT STATUS BITS
;-

US.WCK='B'10           ;WRITE CHECK ENABLED (1=YES)
US.SPU='B'2            ;UNIT IS SPINNING UP (1=YES)
US.VV='B'1             ;VOLUME VALID IS SET (1=YES)

;+
; TERMINAL DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.CRW='B'4            ;UNIT IS WAITING FOR CARRIER (1=YES)
US.DSB='B'2            ;UNIT IS DISABLED (1=YES)
US.OIU='B'1            ;OUTPUT INTERRUPT IS UNEXPECTED ON UNIT (1=YES)

;+
; LPS11 DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.FRK='B'2            ;FORK IN PROGRESS (1=YES)
US.SHR='B'1            ;SHAREABLE FUNCTION IN PROGRESS (0='B'YES)

;+
; ANSI MAGTAPE DEPENDENT UNIT STATUS BITS
;-

US.LAB='B'4            ; UNIT HAS LABELED TAPE ON IT (1=YES)

;+
; UNIT STATUS EXTENSION (U.ST2) BIT DEFINITIONS
;-

US.OFL='B'1            ;UNIT OFFLINE (1=YES)
US.REB='B'2            ;UNIT REDIRECTABLE (0=YES)
US.PUB='B'4            ;UNIT IS PUBLIC DEVICE (1=YES)
US.UMD='B'10           ;UNIT ATTACHED FOR DIAGNOSTICS (1=YES)
US.PDF='B'20           ;PRIVILEGED DIAGNOSTIC FUNCTIONS ONLY (1=YES)
US.MUN='B'40           ;MULTI-UNIT FLAG
US.TRN='B'100          ;UNIT TRANSITION HAS OCCURRED (1=YES)
US.SIO='B'200          ;STALL I/O TO UNIT (1=YES)

;+
; MAGTAPE DENSITY SUPPORT DEFINITION IN U.CW3
;-

```

UCBDF\$ (Cont.)

UD.UNS='B'0	; UNSUPPORTED
UD.200='B'1	; 200BPI, 7 TRACK
UD.556='B'2	; 556BPI, 7 TRACK
UD.800='B'3	; 800BPI, 7 OR 9 TRACK
UD.160='B'4	;1600BPI, 9 TRACK
UD.625='B'5	;6250BPI, 9 TRACK
UD.8K='B'6	;8K BPI - SERIAL, SERPENTINE RECORDING.

```
.MACRO  UCBDF$,X,Y,Z,A
.ENDM
.ENDM
```


APPENDIX D

MICRO/RSX COMMON ERROR CODE DEFINITIONS

This appendix lists:

1. Facility-independent error code definitions
2. Standard Bugcheck formats for facility-defined error codes

```

; -----
; Common (Facility-Independent) Error Code Definitions
; -----

; SST-Type Errors - Error Code 1

BE.ODD = 000100      ; Odd address or other trap four
BE.SGF = 000102      ; Segment fault
BE.BPT = 000104      ; Breakpoint or T-bit trap
BE.IOT = 000106      ; IOT instruction
BE.ILI = 000110      ; Illegal instruction
BE.EMT = 000112      ; EMT instruction
BE.TRP = 000114      ; Trap instruction
BE.STK = 000116      ; Stack overflow

; Internal Inconsistency Errors - Error Code 2

BE.NPA = 000200      ; Task with no parent aborted
BE.SGN = 000201      ; Feature not included in system
BE.2FR = 000202      ; Double fork
BE.ISR = 000203      ; Interrupt service routine clobbered register
BE.FHW = 000204      ; Fatal hardware error
BE.CSR = 000205      ; Device CSR disappeared
BE.IDC = 000206      ; Internal database consistency error
BE.ACP = 000207      ; ACP task aborted
BE.HSP = 000210      ; Header subpacket problem
BE.NCT = 000211      ; No current task

; System Pool Related Errors - Error Code 3

BE.NPL = 000300      ; No pool for operation
BE.DDA = 000301      ; Double deallocation
BE.SIZ = 000302      ; Size of block invalid
BE.BAK = 000303      ; Deallocated block below pool
BE.POV = 000304      ; Deallocation overlaps end of pool

; Group-global Event Flag Errors - Error code 4

BE.GGF = 000400      ; Task locked to non-existent flags

```

MICRO/RSX COMMON ERROR CODE DEFINITIONS

```

; -----
; Standard Bugcheck Format Facility Code Definitions
; -----

; I/O Driver Subsystem - Facility Code 2

BF.TTD = 000200 ; Terminal driver

; Executive Components - Facility Code 3

BF.EXE = 000300 ; Exec - General and miscellaneous
BF.XDT = 000301 ; Exec - Executive Debugging Tool
BF.POL = 000303 ; Exec - Pool handling routines (CORAL)
BF.ERR = 000304 ; Exec - Hardware error processing subsystem
BF.INT = 000305 ; Exec - Internal consistency checking routine
BF.INI = 000306 ; Exec - INITL - initialization module
BF.DVI = 000307 ; Exec - DVINT common interrupt handler
BF.PAR = 000310 ; Exec - Parity memory support
BF.XIT = 000311 ; Exec - Task exit/abort procesing
BF.QIO = 000312 ; Exec - QIO directive
BF.OPT = 000313 ; Exec - Seek optimization
BF.ACC = 000314 ; Exec - System resource accounting
BF.KAS = 000315 ; Exec - Kernel AST support
BF.DIR = 000316 ; Exec - Miscellaneous directives
BF.SAN = 000317 ; Exec - Crash with sanity timer message

```


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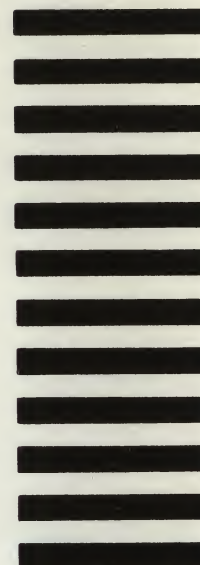
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